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Functional process improvement: the Department of Defense reengineering methodology

Snider, George L.

Monterey, California. Naval Postgraduate School

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Functional Process Improvement:
The Department of Defense
Reengineering Methodology

by

George L. Snider
Lieutenant, United States Navy
B.A., University of Minnesota

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Review of this methodology consists of analyzing Department of Defense and Department of the Navy implementation guidance. Additionally, specific case study examples are explored and utilized. The analysis identifies the methodology's limitations and its' strengths. Included is a discussion of the Department of Defense's efforts to limit the impact of the perceived weaknesses, and exploit the methodology's inherent strengths.

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I. INTRODUCTION

A. BACKGROUND

The 1990's are challenging times for the Department of Defense. With shrinking defense budget, downsizing in personnel and infrastructure, as well as a shifting national defense strategy, profound changes are occuring in all areas of its operations. This changing playing field, coupled with skyrocketing advances in information technology, emphasizes the need for Department of Defense managers to examine business processes and seek substantive improvements in the efficient use of assigned resources.

To foster improved efficiency in the management of DoD's information resources, the Corporate Information Management (CIM) initiative was launched in 1989. The initiative's goals were to:

1. Ensure standardization, quality, and consistency of data from DoD multiple Information Systems.

2. Identify and implement managerial efficiency throughout the Life Cycle Management process.

3. Eliminate duplicate development and maintenance of multiple Information Systems designated for the same functional requirements. [General Accounting Office, February 1991]

Although initially focused towards improving efficiency in the procurement and utilization of Information Systems, the emphasis on managerial efficiency has led to a pursuit of re-designing business processes throughout DoD. By pursuing these goals,

DoD projected savings in the Information Technology portion of its budget totalling $2.2 billion between 1991 to 1995. [General Accounting Office, February 1991] Additionally, by using the same accounting, pay, or supply systems for all the services, DoD expected to take advantage of economies of scale in training and support of systems while improving joint interoperability among the military services.

A basic tenet of DoD is that automating a process without first conducting a business process review and redesign often results in the automation of an inferior process. This reasoning lead to the developed of the Business Process Improvement Program (BPIP). BPIP provides critical Business Process Improvement support to the CIM initiative, thereby assisting DoD functional managers in improving any process and not just those founded in the use of information systems.

An update report on the status of the CIM Initiative (dated October 1992) highlights this support: "The CIM initiative differs procedurally from other cost-cutting and productivity improvement efforts in the DoD in that selection of a set of consistent, computer-aided modeling tools is the common denominator in the examination of all business processes." [CIM Initiative, October 1992] Functional Process Improvement (which DoD considers synonymous with Business Process Improvement) is facilitated by the use of IDEF (pronounced 'eye-deaf') modelling and Activity Based Costing (ABC) techniques.

By using the Integrated Computer-Aided Manufacturing Definition (IDEF) language, practitioners of FPI incorporate the ability to model the current, or AS-IS, business process model (using IDEF0), and data model (using IDEF1X). An

improvement team would then envision and model how the process should be operating in a TO-BE model. Modeling is crucial because it supports iterative review and improvement in the understanding of the current business process. Modeling helps establish a baseline understanding of the process, provides a structured means of discussing that baseline, provides a common language for facilitating discussion, and can open lines of communication for those individuals who are not familiar with the technical intricacies of the modeled process. By capturing (as completely as possible) all critical elements in the business process, improvement alternatives can more accurately be developed and compared.

Apart from the emphasis on modeling the business process, the FPI methodology focuses on the need to compare alternative improvements on a common economic basis. Paul Strassman, former Director of Defense Information, emphasizes this point when he states: "To achieve the highest savings, CIM investments must be based on a functional economic analysis of business activities or operations." [DoD, FEA, 1993] To this end, Activity Based Costing (also know as Unit Costing) is used extensively in creating the business case for each improvement alternative considered.

Activity Based Costing (ABC) is the process of identifying and associating direct and indirect costs to an activity's primary product output. An example of this might be an activity that attaches a pre-made golf club grip to the prepared shaft of a golf club. This activity might grip or re-grip 100 golf clubs in a day at a total labor and material cost of $200. The amount paid for facilities and management of the process might add an additional $10 in indirect costs. The unit cost (or cost based on this activity) would

be $2.10/gripping. More detailed discussion of this concept and its application are presented in following chapters.

By incorporating process modeling and cost collection techniques, FPI presents a structured methodology that defines a function's "as is" environment, its business objectives, and its strategy for achieving those objectives. Following this, FPI facilitates a program of implementing business improvements made through functional, technical, and economic analysis of alternatives.

To assist functional managers in achieving the goals of the CIM initiative, DoD developed the *DDI Interim Guidance for Functional Process Improvement*, which details the procedures for utilizing the methodology (DoD 8020.1M, August 1992); final guidance is expected to be completed by December 1994. DoD 8020.1M details the steps necessary to receive DoD approval when acquiring a new, or substantively improving an existing, major automated information system. FPI was to be utilized to fulfill part but not all of the requirements of DoD Directive 8120.1, *Life-Cycle Management (LCM) of Automated Information Systems (AISs)*. DoD Directive 8120.1 states that "it is DOD policy to control expenditures on the AISs to ensure that derived benefits satisfy the mission needs to the greatest extent possible and in the most cost-effective manner. The AIS cost estimates shall be determined and defended using Functional Economic Analysis." [DoD 8120.1]

FEA is one of the products of FPI. The reasoning for mandating the use of FPI when developing business cases to prove the feasibility of proposed improvements was to provide senior functional proponents a means to "..exercise all necessary authority and

responsibility to continuously evaluate and improve their functional processes, data requirements, and supporting information systems." [DoD 8020.1M]

The steps involved in the process are as follows:

1. Perform Activity Modeling. This is where IDEF0 would be used to develop an AS-IS model of the current process.

2. Perform Data Modeling: IDEF1X is then used to develop a model of system data and data relationships.

3. Evaluate and Select Process, Data, and Information Systems Improvement Alternatives: These alternatives should contribute to the implementation of strategic plans and functional objectives.

4. Prepare the Functional Economic Analysis: A FEA is the principal document in an integrated set of documents that make up a decision package. Initial FEA's are developed to assist the functional manager in choosing the best alternative. Final FEA's are used to secure OSD Principal Staff Assistant approval so that the alternative can be executed.

5. Execute the Approved Alternative: This includes implementing process and data changes, as well as performing functional management oversight of information system changes on behalf of the OSD Principal Staff Assistant.

6. Revise Baseline and Seek Further Improvements: This step highlights the iterative nature of FPI. Activity and Data models are intended to be "living documents" that grow and change as the organization develops. [DoD 8020.1M]

The process described above gives only a brief view of how implementation of the CIM initiative was to occur. Not detailed was the work necessary by the OSD Principal Staff Assistants to develop the functional architecture and identify the current baseline of information systems in specified functional areas. This area of study is not of central concern to this thesis.

In order to expand the use of FPI to areas other than the development and maintenance of information systems, DoD needed to emphasize the general applicability of process improvement to any business process. In a CIM White Paper (reprinted in Federal Computer Week) the Director of Defense Information directed that all DoD investments in Automated Information Systems be evaluated in a Functional Economic Analysis framework. Although IDEF and other related techniques, methods, and tools are considered important mechanisms in implementing the vision of CIM, they should be introduced after the CIM principles and processes have been fully understood. [Federal Computer Week, 27 September, 1991]

From this foundation, DoD sought the development of more general guidance to functional managers. To this end, the *CIM Process Improvement Methodology for DoD Functional Managers* (prepared by the D'Appleton Company) was published in January 1993 for the use of DoD. This guidance was intended to lend a general business tone to FPI, thereby expanding its applicability to DoD improvement programs. The bureaucratic approval process was de-emphasized in order to improve FPI's ease of use by functional managers not working on major automated information systems. Examples of actual application were emphasized in this guidance so that the document possessed more of a "real world" foundation rather than an instruction format.

Similarly, the Navy Information Systems Management Center (NISMC) developed guidance that it intended to be specifically tailored to the Department of the Navy. Like *CIM Process Improvement Methodology for DoD Functional Managers*, the *Functional Process Improvement Implementation Guide* was designed to assist functional managers

(specifically those in DoN) in better understanding and utilizing the FPI methodology and tool set. The work by NISMC also launched the first implementation pilot products conducted in DoN utilizing the FPI methodology. The lessons learned from these projects are included as part of the implementation guide. One of these projects is the subject of further study later in this thesis.

B. FPI IN THE PUBLIC AND PRIVATE SECTORS

The Functional Process Improvement methodology has been used primarily within DoD. Some pilot program work has been conducted in the separate military services, but only those conducted in DoD and DoN will be addressed by this thesis. In the private sector, a methodology incorporating some of Functional Process Improvement's characteristics has been used by General Motors Corporation.

This thesis reviewed two government cases where the FPI methodology was utilized. In DoD, the Defense Logistics Agency(DLA) utilized this methodology in studying consumable item management. This Business Process Improvement project was conducted from July 8, 1992, through November 20, 1992.

In the Department of the Navy, the Naval Information Systems Management Center sponsored a project examining the business process for requesting and scheduling training for civilian personnel. The project addressed the development of an improved training coordination process by studying over fifty training coordinators at three separate sites. It was conducted from April 1992 through September 1992.

In the private sector, General Motors (GM) Corporation relied extensively on the IDEF0 process modeling tool in its Engineering Process Improvement Commitment (EPIC) project. The GM project is of value in that it addresses how non-government organizations have attempted to use portions of the FPI methodology, specifically IDEF0. Review of GM's perceived success or failure can assist in determining whether IDEF0 has survived the marketplace.

Diverse cases were reviewed in this study so that general business theories could be developed without distortion from implementation idiosyncracies in any one domain. Understandably, GM's application and utilization of IDEF in the production of automobiles is vastly different from that of the Defense Logistic Agency's work in Consumable Item Management. The diversity of the cases examined, as well as other pertinent work in the field of change management and process improvement, led to the identification of substantive strengths and weaknesses in the application of the FPI methodology. These findings are presented in Chapters IV and V.

II. PROCESS IMPROVEMENT PHASES AND TOOLS UTILIZED

A. OVERVIEW

The written guidance reviewed in Chapter I demonstrates how the Functional Process Improvement (FPI) methodology was expanded to be more applicable to general business processes. In this way, it has become less codified and structured. In fact, when DoD Interim Guidance for Functional Process Improvement (8020.1M) is replaced (expected in December 1994) with final guidance, the new 8020.1 is expected to be more streamlined in its discussion of the review process and will take into account various cultural aspects of DoD that affect implementing process changes. [Telcon, Gracie, February 1994] Some of the results of this are expected to be the inclusion of Business Process Reengineering (BPR) concepts, such as those presented in *Reengineering the Corporation* [Hammer and Champy, 1993]. Additionally, a more focused study concerning the utilization of human resources in the change process will be included. Based on this evolution, FPI has become a more generalized process following the six phases as shown in Figure 1.

We will explore the application of the six tools used to support the phases shown in Figure 1. These are Strategic Planning, Process Modeling, Information (or Data) Modeling, Activity Based Costing, Benchmarking, and Functional Economic Analysis. Examples from the Defense Logistics Agency Business Process Improvement Project on Consumable Item Management will be used to illustrate the concepts.

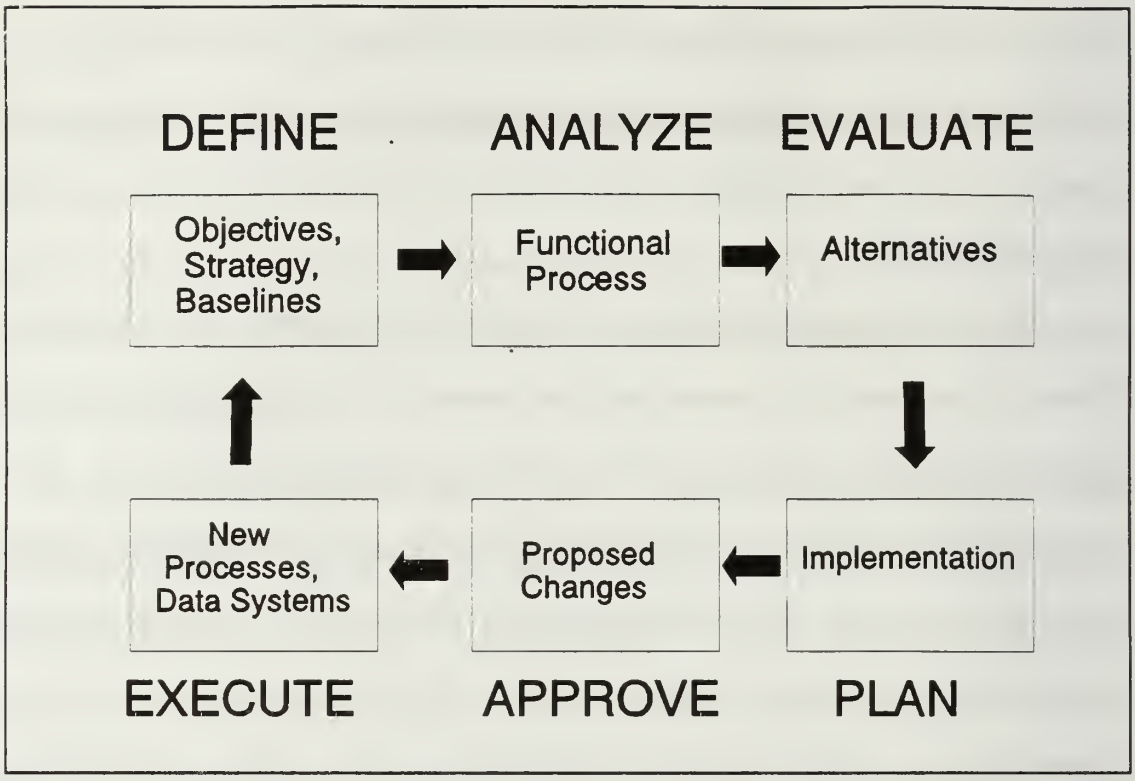

Figure 1 Functional Process Improvement Cycle [FEA Guidance, 1992]

B. STRATEGIC PLANNING

Much emphasis has been placed on strategic planning in contemporary literature. Whether directly addressed by works such as *Strategic Planning for Public and Nonprofit Organizations* by John Bryson, or indirectly by focusing on the concepts of Corporate vision and purpose ala *Reengineering the Corporation* (Hammer and Champy), these works provide evidence that any process improvement project would be wise to start by developing a strategic plan.

Clearly, before making any overreaching change in an organization, the planners should first envision the final state of the process they are attempting to develop. That is not only good managerial practice, but the envisioned final state also provides a gauge

of the project's success. To increase the potential for process improvement success, strategic planning should be used as a disciplined effort that produces fundamental decisions and actions that will shape and guide the understanding of what the organization is, how it performs in a given environment, and why it performs as it does.

Understanding what effective strategic planning is intended to provide further clarifies the above assertion. Stated simply, strategic planning is an assessment. First, it is an assessment of how the organization views its mission. Second, it is an assessment of the direction given the organization by its stakeholders. Third, it is an assessment of how the organization views changes in its environment. This could be either in technological trends or business trends as highlighted by competition.

Following this assessment, strategic planning is used in the FPI methodology to develop a plan that aligns the organization's vision of itself and its objectives which, if reached, will mean success for the organization in its perceived environment. In the private sector, much attention in this area is directed towards maintaining a competitive advantage. For DBOF (Defense Business Operating Funds) Activities, which charge their "customers" for provided services, maintaining competitive advantage may be very applicable. For an operational unit, strategic planning can focus attention on what elements in its mission must be achieved; sometimes at the expense of other objectives. Peter Drucker argues the importance of this focus in his work, *Managing the Nonprofit Organization*. [Drucker, 1992]

One of the most significant aspects of strategic planning in FPI is how it can be used to secure executive commitment to improvement projects. With a well developed

and adopted strategic plan as a foundation, improvement projects can be based on a defined scope and purpose that demonstrates support for the direction of the organization. As such, strategic planning assists improvement projects by providing a clear justification for team member involvement and resource support.

In the case of the Defense Logistics Agency (DLA), the project charter required that the TO-BE model incorporate the business improvements defined in the Logistics Business Strategic Plan. The charter specified the scope and purpose of the project, as well as when the work of the team was to be completed.

C. PROCESS MODELING USING IDEF0

The IDEF methodology was originally developed by the United States Air Force to increase manufacturing process productivity. As IDEF evolved from its beginnings in the Integrated Computer-Aided Manufacturing Program (circa 1970's), it became a tool useful for modeling business processes. For this reason the modeling procedures utilized by IDEF were refined and codified by DoD and software vendors that developed tools utilizing the IDEF methodology. IDEF1X, which we will discuss in the following section, was developed to provide a means for modeling the data structure of the business process.

1. Why IDEF0?

In 1992 the Defense Department's Information Technology Policy Board mandated the use of the IDEF modeling technique. The stated rationale for choosing IDEF0 over other process modeling techniques (such as Data Flow Diagrams) was:

1. IDEF0 allows thorough documentation and definition of the problem area, thereby facilitating its solution.

2. Problems should be analyzed in a modular, hierarchical, and structured top-down method.

3. IDEF0 better depicts redundant activities, interrelationships among the activities, and how the activities fit into a hierarchical structure.

4. IDEF0 supports disciplined and coordinated teamwork and consensus.

5. IDEF0 is structured and rigorous.

6. IDEF0 follows the principle of gradual exposition of detail. [Vogel, 1993]

By using IDEF0, the modeling team develops a procedural, rather than organizational, depiction of business functions. By focusing on the process, IDEF0 can highlight unnecessary steps, duplication of effort, overlapping organizational responsibilities, unused outputs, lack of automation in processes, and under-utilization or waste of resources. Discussion of IDEF0's perceived strength as a process modeling tool is presented in Chapter Five.

2. Understanding the IDEF0 Process

In its most rudimentary form, IDEF0 process models begin with an *Activity*. An activity is represented by a rectangular box with a descriptive label of the activity. Four sets of arrows lead into or out of the box, as shown in Figure 2. Arrows entering from the left are *Inputs* such as, information or materials used by the process. From the top are *Controls*, such as regulations, laws, or any other constraint

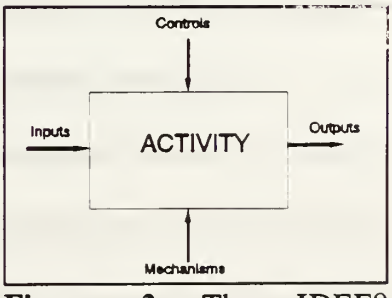

Figure 2 The IDEF0 "Activity"

on the process. To the right of the process are *Outputs*, which are what the process produces. At the bottom of the process are *Mechanisms*, these identify how or by whom the process is performed (i.e., what people, tools, etc.). When discussed as a group, these arrows are referred to by their initials as *ICOM*s.

At a macro-level of depiction, with the least degree of detail, the activity is modeled in what is called the *Context Diagram*. The Context Diagram identifies the entire business process being modeled, as well as the purpose, scope, and viewpoint taken by the modeling team. The back page of the model (not shown) is used to provide a text description of the Context Diagram. In Figure 3, the DLA example is used to illustrate this concept.

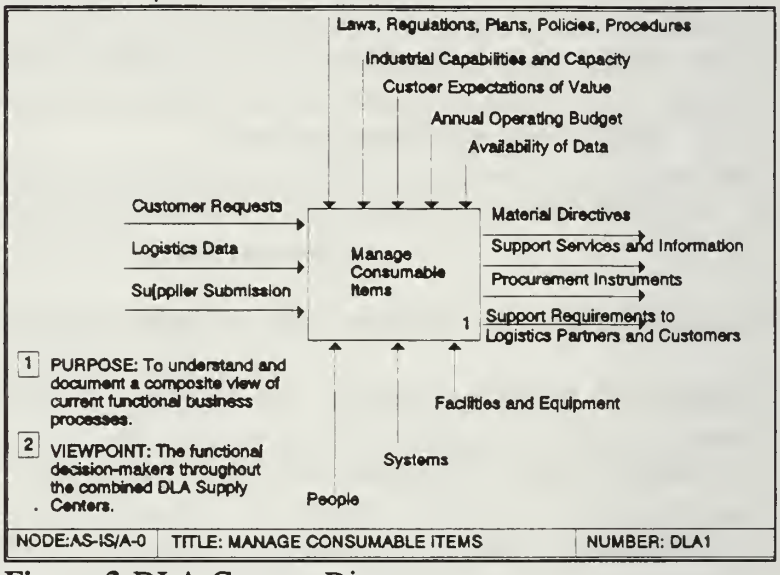

Figure 3 DLA Context Diagram

The next model used in studying the process is a *Node Tree*. Pictured in Figure 4, the node tree shows the hierarchical structure of the modeled process as it is divided into its subordinate parts. Each node in the tree is expanded until the lowest level node can be easily understood as a single activity. By using the Node Tree, the improvement team can determine at what level to conduct the improvement project. This

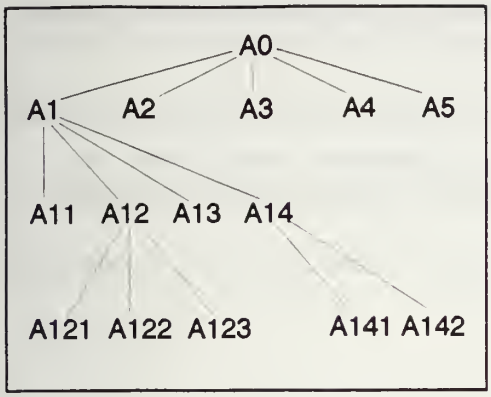

Figure 4 IDEF0 Node Tree Example

decision would be based on the degree of detail required to fulfill the improvement projects charter.

The next step in modeling is accomplished using a *Decomposition diagram*. This diagram is a more detailed version of the context diagram, and is used to break the parent activity and that activity's ICOMs into finer detail. The modeling team uses the Node Tree to determine the activities to be modeled in a particular Decomposition Diagram. For example, if Activity A12 (as shown in figure 4) were decomposed into a lower level diagram, that lower level diagram would model activities A121, A122, and A123.

Decomposition is used to model where in the process each ICOM is actually used. Appendix A contains excerpts from the DLA process model. This appendix includes the context diagram, the first decomposition of the context diagram, and the decomposition of activity A2 (Provide For Market Requirements). By modeling where ICOMs are used, it is possible to uncover relationships among activities not addressed by process flow. An example of this is shown in the decomposition diagram of activity A2, all three sub-activities were determined to utilize the Logistics Data input.

The last section of an IDEF0 model is the Data dictionary. A well developed and documented data dictionary is vital to the success of the improvement project. The data dictionary ensures that a common language is used and understood by all

Process: Manage Requirements

Definition: Includes all the processes required to develop, maintain, and evaluate the Requirements Plan.

Origination Date: 08/18/92

Date Revised: 10/26/92

Who Revised: SMS

Figure 5 IDEF0 Data Dictionary Entry Example

improvement team participants by defining and standardizing all data elements. Figure 5 contains a modified example from the DLA project data dictionary.

As we will see, the first step in using each of the following tools in the FPI methodology is to analyze the process model. Because the process model lays the foundation for all the following steps in the FPI process, a poor process model can hamper the improvement team's ability to analyze the business process and determine any substantive improvement alternatives.

D. INFORMATION MODELING USING IDEF1X

Information Modeling using a tool such as IDEF1X provides a model of the information used in the business process, the entities (e.g., Customer Requests) where the information resides, as well as the rules that govern how that information is shared and produced. Under the FPI methodology, IDEF1X tool is used to produce the data model that supports the logical design of a relational database. For systems not involved in the creation of a relational database, IDEF1X is used to highlight the business rules

that define, expose, or model the underlying policies and constraints of the business process. Because the data model is generally developed to the same level of detail as the accompanying process model, the business rules uncovered may not reflect all of those applicable to the organization. Additional discussion of this concept follows near the end of this section.

Entities represent the data that is contained in a single ICOM or a combination of ICOMs in the process model. The example in Figure 6 is based on an ICOM from Node A-2 included in Appendix A. An *Entity* is comprised of a *Key Attribute* (e.g., Request#) and *General Attributes* (e.g., Date). Attributes depict what information is contained within an entity. In the process improvement process, this depiction can bring to light concerns as to why the attributes exist in any modeled entity. In the DLA case study, IDEF1X was not used. Figure 6 therefore is an attempt to illustrate how IDEF1X might have been used based on the ICOMs developed by DLA.

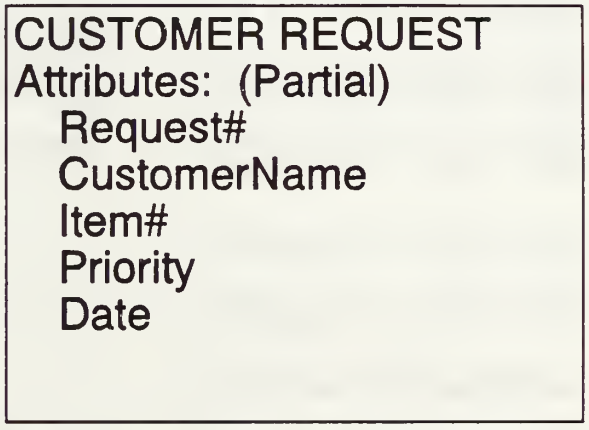

Figure 6 IDEF1X Entity Example

After developing each entity, the data modeling team would then consider how the entities relate to one another. Entities relate in a variety of ways that can be defined by whether they are mandatory and whether they are multiple or singular (modality). Modality of relationships is depicted by either a 1 if only a single entity instantiation is possible in the relationship, or N for multiple instantiation (or M in the case of multiple

to multiple). Mandatory relationships are depicted by a hash mark across the relationship line while non-mandatory relationships are indicated by an oval across the relationship line. Based on this, Figure 6 would depict two entities, drawn from the "Manage Resources" activity example in the preceding section, that would possess a mandatory one-to-many relationship.

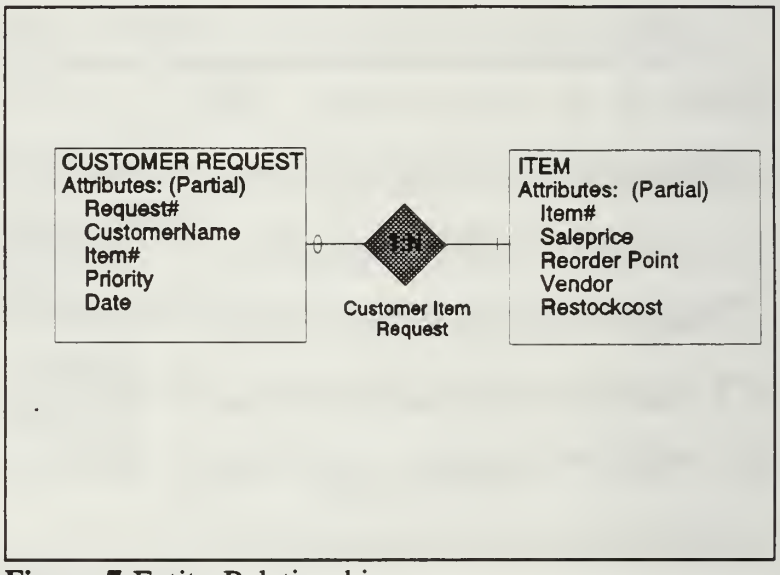

Figure 7 Entity Relationships

Converting key-based data models (with partially established attribution) to fully attributed data models with near error-free dependencies and reduced redundancies is normally accomplished by technical specialists in data administration. For the most part, unless the process improvement involves re-designing a relational database, this degree of detail is unnecessary. For a detailed description of data models and their application the reader is directed to an excellent reference on the subject, Chapter 4 of *Database Processing* by David M. Kroenke. [Kroenke, 1992]

Of importance to all improvement efforts is the derivation of business rules that come from expressing the relationship of entities in common English. Using the example in Figure 7, we could develop the following Business Rules:

1. Customer Requests must contain only one item per request.
2. Items may be requested by many Customer Requests.

In *Re-Engineering the Corporation*, Hammer and Champy emphasize the opportunity to reap substantial rewards from process re-engineering by uncovering business rules. [Hammer and Champy, 1993]. Although Hammer and Champy are referring to rules that effect an organizational on a large scale, the concept is applicable here as well. From the above example we could ask questions such as "Should customers be restricted to only requesting one item per request?" This question helps to determine whether opportunities such as those highlighted by Hammer and Champy exist for this modeled relationship.

The last element of the Information Model is the Glossary. Much like the Data Dictionary used in IDEF0, the Glossary provides a commonly accepted means of ensuring that all improvement team members are "speaking the same language" when they discuss the model. An example entry in an Information Model Glossary is provided in Figure 8.

Entity: Customer Request

Definition: Contains a request for a single Item.

Origination Date: 11/11/92

Date Revised: 12/12/92

Who Revised: DLA

Figure 8 IDEF1X Glossary Example

E. ACTIVITY BASED COSTING

Activity Based Costing (ABC) performs a vital role in the FPI methodology by providing a means to account for the cost of producing the

output of a modeled activity. As utilized in the FPI methodology, ABC determines the cost of each modeled activity, identifies high cost drivers, and provides the costing baseline for future business process improvements.

The first step in using ABC is to return to the process model (IDEF0) to analyze the activities targeted for improvement. In the DLA case study, activities at the third level of decomposition were chosen for analysis; an example of this level is presented in Appendix A. This decision was made by DLA so that activities would be sufficiently detailed to facilitate cost assignments.

Highlighting the iterative nature of FPI, the first task of the improvement team when using ABC is to validate the process model. This increases the team's assurance that the developed model accurately depicts how the business processes are actually performed.

The next step is to gather data regarding all costs associated with each organizational entity (i.e. departments). This process can be very time consuming but, like much of the FPI methodology, if completed properly the data gathered and modeled should be reusable on future improvement projects. DLA focused on labor costs for civilians and military, as well as overhead costs for management where they could be accurately determined and applied with confidence.

The third step is to trace costs to specific activities in the process model. The costs gathered in step two are applied to each activity as a percentage of the time an organizational entity conducts that activity. For example, referring to Appendix A, if the Accounting Department spends 40 percent of its labor to "Reconcile Records"

(activity A232), then the improvement team would assign 40 percent of the Accounting Departments costs to this activity.

Step four involves the establishment of an output measure. This is usually a unit cost. Simply stated, a unit cost is determined by dividing the total cost for performing an activity by the number of output units generated by that activity. The importance of focusing on a single activity output is that it helps keep the picture as clear as possible. Continuing the example in the preceding step, the organization could determine the unit cost for DLA to "reconcile a record." Regardless of whether the activity that performs the "reconcile a record" function is the target an improvement alternative, determining the unit cost associated with each record requiring reconciliation could provide an objectively measured value to the savings generated from improving other activities (if those improvements reduce the number of records that require reconciliation).

The final step in ABC is to analyze the costs associated with each activity to determine candidates for improvement. The DLA case study provided costing information for each of its activities based on labor costs, percent cost of each activity at the first two levels of decomposition, and the activity's contribution to small- and large- buy process costs (a purchase quantity of more than 25,000 items would be considered a large-buy). As an aside, in a more detailed application of ABC more cost elements might have been used. DLA deemed that degree of detail to be unnecessary based on its intention to significantly change the current business practices.

By analyzing the costing information collected by DLA, the improvement team could determine if a potential for improvement existed in each activity. If so, further

investigation would be completed using *Benchmarking* and *Functional Economic Analysis* as will be addressed in later sections.

The benefit of ABC is that costing data is organized in a manner that is easily understood by functional managers. Using ABC, activities are first distinguished as either primary or secondary. Primary activities are those that contribute to the central missions of an organization, such as educating military officers for the Naval Postgraduate School. A secondary activity does not contribute directly to the primary mission, i.e. conducting random urinalysis testing. Primary activities can be further classified as either value added or non-value added. Non-value added (NVA) activities generally involve inspections, correction of mistakes, or compensation for lack of quality in products. Secondary activities can be further classified as essential (required by law, regulation, and so on), or non-essential (being done for no apparent reason). These classifications enable functional managers to use a variety of techniques to simultaneously combat waste and improve performance. Because secondary activities are considered NVA by default, the requirement for essential secondary activities should be modified where possible to make them non-essential. Non-essential and NVA activities should be reduced or eliminated, thereby improving the efficiency of the overall process. For a more detailed discussion of ABC and the above concepts, the reader may wish to review *DoD 8020.1M*, Chapter 8, Section E.

F. BENCHMARKING

Benchmarking is the process of finding the best practice for conducting a given business activity. By finding the best in the field, the process improvement team is not required to "re-invent the wheel" when making improvements. The most direct way to explore the concept of benchmarking is to consider the benefits and drawbacks of this approach.

What is provided by benchmarking clearly justifies its exploration. If a successful process can be uncovered that matches the process being innovated, a "blueprint for success" is presented to the improvement team. Benchmarking also provides a means of using observed processes to spark the improvement team's own insights. A final benefit of benchmarking is that it can be used to displaying a successful implementation in another agency or company, so that managerial commitment to a proposed improvement alternative can be more readily accepted.

When conducting benchmarking the improvement team must avoid some possible pitfalls. There is a potential that the improvement team might miss key elements in why the studied process works for the benchmarked company. Another is that benchmarked processes may not fit the idiosyncracies of the agency conducting the process improvement. Finally, the best process in the field may still be less efficient than what the improvement team can develop themselves.

So how, then, is benchmarking pursued? First, the improvement team would return to the process model, and determine which activity (or group of activities that comprise a process) could lend itself to benchmarking. The next step is to identify the

best business practices being executed in the industry. Much of the guidance developed by DoD and DoN emphasize that the improvement team must not limit itself to DoD or DoN. Hammer and Champy take this emphasis further by stating "[i]f you can't find [a best practice] this should be used as a challenge to the process improvement team to set one." [Hammer and Champy, 1993]

Once a benchmarking example is uncovered, the improvement team would then analyze the difference between the target and their own organization. Following the analysis, and the development of any substantive changes to an uncovered benchmarked process, the team would identify the implementation goals for the process. These goals are used as a foundation for developing and comparing improvement alternatives.

In an example of this method, DLA made the decision to study Price Club, Incorporated to gain insight into their own process improvements. As is highlighted in the case study, some aspects of what is learned are applicable, while others may not be. For example, Price Club intentionally ignores customer demands in market segments that they deem to be unprofitable, while DLA is mandated to satisfy all DoD requisitions. The DLA study continues to say that Price Clubs methodology may be useful if DLA could segment its consumable item inventories. [DoD, DLA, 1992] DLA began a reorganization along these lines in January of 1993. [Endoso, March 1993]

G. DEVELOPING THE BUSINESS CASE USING FEA

A business case is a detailed plan for implementing a process change. Essential to the preparation of a business case is a thorough understanding of both the current

business environment and the implementation requirements for the proposed improvement. To generate a standardized business case format, DoD developed the FEA methodology and FEA Model (FEAM) software tool. The FEAM is used to compare cost and savings projections for each proposed alternative to the current AS-IS baseline, and to the other proposed alternatives. FEAM presents the comparative results in graphical as well as tabular format.

FEA's focus is very similar to that of the FPI methodology. As the *FEA Guidebook* states, FEA was designed to address three general principles:

1. **Functional Focus**. Being designed to evaluate changes in a functional process, FEA provides decision makers with a bottom line approach to use resources effectively in meeting defined objectives and strategies.

2. **Measurement**. FEA requires a full risk-adjusted weighing of costs and benefits so that decision makers can determine each alternative's economic viability.

3. **Management Tool**. DoD guidance emphasizes that the use of FEA is an ongoing requirement. That is, after a FEA is developed, it is updated as events dictate. [DoD, FEA, 1993]

Development of the business case is the culmination of the six-phase process of FPI, as diagramed in Figure 1. First, the current business environment is defined, analyzed, and evaluated using IDEF0, IDEF1X, and ABC. These tools expose improvement opportunities, each of which might be developed as specific improvement alternatives. For each alternative, the improvement targets or goals are then developed. These targets and goals assist in determining the expected benefits of each alternative, as well as help the improvement team determine the associated risks. To ensure that

improvement alternatives support the strategic targets and goals of the organization, each alternative is reviewed against the functional area and organization strategic plans.

The preceding steps in the FPI methodology allow FEA to provide a review of the current understanding of the business process. The business case is then used to plan the implementation of improvement alternatives, presenting the implementation plan with all alternatives considered, and accounting for the identified risks of each alternative. Included in discussing the resources required and risk associated with each alternative, the business case addresses the technical feasibility, resource availability, cultural commitment, and manageability.

A business case developed using FEA provides three vital items to the manager of improvement efforts. First, by identifying the projected benefits of each alternative and associated risk on a common economic foundation, the business case allows alternatives to be reviewed and compared in detailed fashion. Second, by developing an implementation strategy for each alternative that incorporates all support systems, the business case demonstrates proper managerial planning and accountability. Third, by identifying performance measurements for each alternative, the business case remains a useful managerial tool for determining the success of improvement alternative that are approved and executed. The DLA Case Study did not contain a FEA; rather, it provided the approved TO-BE process model for the supply center of the future, and discussed financial concerns that highlighted why the modeled alternative was accepted.

Comparing alternatives using FEA involves accounting for the initial monetary commitment and annual additional cost of each alternative throughout its projected life

cycle. These costs can be compared using FEAM, or by simply determining the net present value (NPV) of each alternative. FEAM is much more sophisticated, and utilizes a Risk Adjusted Discounted Cash Flow (RADCF) method that simulates probable best- and worse-case scenarios to establish upper and lower bounds for the relative success of each proposed alternative. This determination is developed by the FEAM based on variables that the user has identified as changing in each scenario (i.e. fluctuating interest rates).

The *CIM Process Improvement Methodology For DoD Functional Managers* provides an example of the NPV comparison, while the *FEA Guidebook* should be referred to for further information regarding FEA or the FEAM.

H. MATCHING THE TOOL SET TO THE SIX PHASE METHODOLOGY

To recap the tools utilized in FPI, Figure 9 provides a depiction of each of the six phases of process improvement. It should be noted that FPI is an iterative process for improvement. Although the tools utilized have been presented in sequential order for a generally sequential six-phase approach, FPI requires multiple reviews of each phase to ensure that a complete process or data model has been developed and improvement alternatives are generated from a sound research

	Strategic Planning	Process Modeling	Data Modeling	Activity Based Costing	Benchmarking	Business Case
Define the Business	X	X	X	X		
Analyze the Processes	X	X	X	X	X	
Evaluate Performance	X	X	X	X	X	X
Plan Alternatives		X	X		X	X
Approve Alternative						X
Execute Alternative						X

Figure 9 Tool/Phase Comparison

foundation. This iterative nature is specifically highlighted by the emphasis placed on using the business case as an ongoing managerial document.

III. FUNCTIONAL PROCESS IMPROVEMENT IMPLEMENTATION

A. INTRODUCTION

This chapter presents a review of the Defense Logistics Agency (DLA) Consumable Item Management(CIM) Business Process Improvement(BPI) Project, the Department of the Navy Civilian Personnel Training BPI Project, and the General Motors Engineering Process Improvement Commitment (EPIC) project. The case studies, DoD and DoN guidance, and interviews with various individuals involved in these and other BPI projects highlight that the FPI methodology is very time consuming and rigorous. This is important to state before reviewing these studies so that deviation from a strict application of the FPI methodology is considered in the appropriate light. Discussion of whether any deviation should be considered to detract from the usefulness of the methodology will be presented in the following chapter.

Both cases reviewed relied on facilitators external to the Department of Defense. In such a role, consultants provide technical guidance on the use of the IDEF tool set, assistance in developing managerial guidance for process improvement, and guidance for improvement teams in their day to day operations. Giving focus to the improvement projects seemed essential to the production of detailed process models and improvement alternatives.

B. DEFENSE LOGISITICS AGENCY CONSUMABLE ITEM MANAGEMENT BPIP

The Defense Logistics Agency is the Consumable Item Manager for most of DoD. Of the estimated five million consumable items used within DoD, DLA manages over three million at the time of the case study. As DoD continues to move toward consolidation and streamlining under the CIM Initiative, it is anticipated that DLA will increase the number of consumable items it controls.

DLA's current business processes, as modeled in the first layer of the AS-IS decomposition model, are resource management, determining market requirements, providing technical and quality support, procuring material and services, and providing transportation support for delivering goods and services. The AS-IS process model developed shows how understanding of these business practices by the modeling team expands as they decompose the process model. Increased knowledge of the business processes is essential to the modeling team so they are more effective in developing improvement alternatives.

1. Project Background

DoD established the Joint Logistics Systems Center (JLSC) to design, develop, and integrate its Material and Logistics Systems. In keeping with that purpose, JLSC sponsored the DLA project to review current supply-related management systems and propose innovative improvements. JLSC's intention was to incorporate the results of DLA's modeling efforts into the DoD-wide TO-BE Material Management Model.

DLA's charter therefore, was to research better business practices, and not necessarily to immediately implement what was developed.

Based on that charter, DLA defined the project's objectives as developing a detailed understanding of their current business practices, identifying potential short- and long- term improvement alternatives, and creating a TO-BE process model that would document the business processes best serving the consumable item management needs of DoD. Meeting these objectives would lay the groundwork on which following projects could build.

The first consideration in this effort, as defined by the FPI methodology, was to review the functional area Strategic Plan that this research would support. JLSC was established to enact the Logistics Business Strategic Plan (LBSC) of the CIM initiative. DLA would support the LBSC by exploring possible migration systems and elements useful in finding the requirements of a functional area common system.

2. Conduct of the Project

The project began with an initial ten-day training seminar for ten of the improvement team members. The seminar was used to teach the members about the FPI methodology, and train them in the application of the IDEF tool set. These members thereby formed DLA's corporate knowledge base for the project. Two members were used as team leaders for each of the five improvement teams. A consultant outside DoD who was experienced in the application of the FPI methodology conducted the seminar.

Following the training seminar, all the project members gathered for a workshop. The workshop was vital to the success of the DLA project because the team members

jointly established their charter, objectives, scope, and perspective for conducting the project. By establishing a well developed understanding of the project requirements, and incorporating team member considerations raised at the initial meeting, DLA solidified team member commitment to the project, and managers who released resources to support the project were assured that this investment was not in vain.

The perspective used for modeling the processes was that of an individual Defense Supply Center (DSC) rather than DLA headquarters. This choice of perspective allowed team members to concentrate on how the process is, and then should be, conducted at the "operational" level.

The teams modeling efforts focused on identifying high cost and long lead time activities. Team leaders met as a group throughout the development of the process model, and then conducted a two-day walk-through of the completed model. These walk-throughs validate that the model best represented the team's understanding of how DLA business processes functioned. Following the team's validation, the model was presented to various personnel in the individual DSCs.

After receiving this additional level of validation, the improvement teams collected costing data related to the modeled activities. Analysis of the data collected led to improvement alternatives that simplified, automated, or combined value-added activities. For Non-Value Added (NVA) activities, which comprised 40% of all modeled activities, improvement alternatives emphasized elimination of those not required by DLA or higher authority and reduction, simplification, or policy modification for NVA activities considered essential. The potential savings generated by all proposed

improvement alternatives would reduce operational costs by 30% ($89M) of the total cost to Manage Consumable Items.

As the improvement team moved from developing the AS-IS model to envisioning the TO-BE model, an interesting point was raised regarding the composition of the improvement teams. In the definition phase, functionally aligned teams were used to accurately model the processes, but cross-functional teams were used for the TO-BE process modeling. One consequence of this was the envisioned restructuring of a DSC around four major cross-functional processes: Support the Corporate Environment, Market the Business, Provide for Material Requirements, and Provide Engineering and Technical Support. [DoD, DLA, 1992]

The improvement teams went beyond the use of ABC by also conducting a process flow analysis of DLA's two major procurement processes, large- and small- buy procurements. Included in Appendix A is what DLA found to be the AS-IS functional flow vs. process flow for large buys. This comparison highlights the inefficiency of the process flow as currently performed by showing the path taken by a sample procurement through DLA's current business structure. The team's emphasis for improvement alternatives generated from this analysis was to reduce wait times between activities and processing times within activities. Those activities exhibiting the largest of either of these delays were the first reviewed for improvement.

The catalyst for this process flow improvement is the anticipated utilization of a shared database to allow decision makers to address all aspects of Integrated Logistics Support. The application of information technology for DLA's process

improvement produced dramatic results exceeding what is usually expected in an incremental improvement program. From this application, DLA projects that they will reduce excess material and safety levels of stocking, thereby producing a savings opportunity of $88M, or a 20% improvement over that of a typical hardware supply center. [DoD, DLA, 1992] Also very impressive is the reduction in lead-time of 75% for small-buy and 37% for large-buy procurements.

3. Comments

In a partial deviation from the standard FPI methodology, DLA chose not to use the IDEF1X information modeling tool. DLA's specific intent to develop a TO-BE process model significantly different from current business practices may have made IDEF1X unnecessary in this case. As presented in the previous chapter, though, IDEF1X's ability to bring to light current business rules might have uncovered aspects that the improvement team did not consider. It is not readily apparent whether the benefits of developing a data model would have justified the time, training, and cost required. DLA went significantly beyond ABC analysis by also conducting timeline and process flow analysis, the important aspect of which was a review of business processes from beginning to end. The results of doing this were mentioned previously.

Also of significance, the DLA improvement team met with OASD(C3I) Defense Director of Information (then Paul Strassman), and the DoD Comptroller. The improvement team also met with the Principal Staff Element Directors within DLA. These meetings were an attempt to discuss senior management's expectations of the improvement team's results. By doing this, the team maintained managerial commitment

in the BPI project. This would have been more important had the intent of the project been to conduct actual process changes rather than research.

Note that the DLA study did not appear to include a final or initial Functional Economic Analysis on any alternative. The case study says that the improvement team reviewed each process improvement to decide whether the improvement was "implementable." Detailed discussion of this review was not presented. Although review of each alternative was conducted, by not presenting an FEA it seems possible that DLA concentrated on the benefits of each alternative but not the costs or other difficulties associated with initiating improvements.

DLA was not oblivious to these concerns. The case study refers, to concerns that DLA's personnel in changing business structure are the "pacing aspect of DLA's goals to reduce inventories and operating costs." [DoD, DLA, 1992] Regarding monetary investment, the study estimates the costs associated with the proposed improvements as five percent of current total costs. That figure would be approximately $15M.

Continuing this point, the study concludes by stating that DLA needs to "develop a 'change management' strategy that targets areas for improvement, develop baseline measures and a strategy to change the work habits of employees and styles of managers." [DoD, DLA, 1992] Without doing this, the alternatives developed are much like user requirements when developing information systems. That is, an improvement alternative such as "Establishing a Tiered Pricing System" may make intuitive sense but

determining whether it makes managerial or economic sense cannot be made until costs are collected, analyzed, and projected. This is the purpose of the business case.

C. CIVILIAN PERSONNEL TRAINING IN THE DEPARTMENT OF THE NAVY

Civilian Personnel Training is managed in the DoN by 101 separate Human Resource Offices (HROs). The HROs are located at major DoN facilities and probably the largest of these is HRO-Crystal City. The scheduling and tracking of training for civilian personnel is one of the HRO business processes; others include the management of accession, career management, and separation for civilian employees. The reviewed BPI project concentrated solely on the Request and Schedule Training business process from the viewpoint of HRO-Crystal City.

An intriguing aspect of an HRO's responsibility is to manage aspects of civilian personnel resources that support the mission of the DoN. Under the CIM initiative, though, management of civilian personnel has become a DoD-wide business process. This review will highlight the impact mission priorities and duality of command had on the project managed by HRO-Crystal City.

1. Project Background

With the development of the CIM initiative, and subsequent establishment of FPI as the means of achieving CIM goals, DoN decided it was necessary to develop a corporate knowledge base supporting the methodology. The identification of four pilot projects to test this methodology was made by the Naval Information Systems

Management Center (NISMC). These pilot projects were conducted between April and October of 1992, HRO-Crystal City (HRO-CC) managed one of these projects. The project was conducted using participation from over 50 training coordinators serviced from HRO-CC, Naval Weapons Station (NWS) Concord, and Naval Surface Warfare Center Division Dahlgren (NSWCDD). NISMC's intention was to use the pilot projects to gather information about, gain experience with, and provide insight into managing BPI projects. NISMC used the knowledge gained in the sponsored pilot projects to develop DoN's *Functional Process Improvement Implementation Guide.* [DoN, NISMC, 1993]

HRO-CC managed the Human Resources Development pilot project to seek improvements in the process of requesting and scheduling training for civilian personnel. Although initiated by NISMC, the strategic plan supported by the project was developed by the Deputy Assistant Secretary of Defense for Civilian Personnel Policy and Equal Opportunity. The goal of the strategic plan is to "develop and maintain a highly qualified, well-trained, representative civilian work force that can respond rapidly and effectively to changing priorities and missions." [Cartland, J., et al, August 1993] This was also the guidance for a BPI project being conducted by DoD -- during the same time period -- to establish the Defense Civilian Personnel Data System

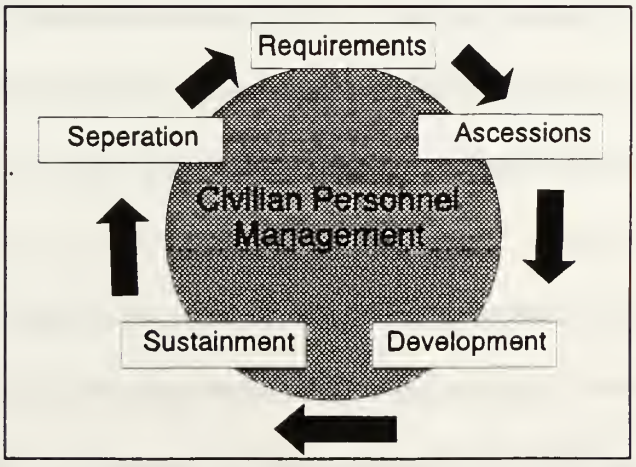

Figure 8 DoD Target Civilian Personnel Management Life-Cycle

(DCPDS). The DCPDS used as a foundation for their work the DoD Target Civilian Personnel Management Life Cycle. Figure 10 shows an abridged version of this life-cycle. The work of HRO-CC, NWS Concord, and NSWCDD, support the Development Phase of the life cycle model.

The objectives generated for this improvement project were:

1. develop a new streamlined procedure for requesting and scheduling of training services,

2. provide training information to NAVSEA supervisors and managers,

3. share these improved processes with other personnel offices throughout the Department of the Navy, and the Department of Defense. [DoN, HRO-CC, 1992]

These objectives arguably were not very bold, and should have been the first indication that this project may have lacked managerial commitment.

2. Conduct of the Project

This project commenced with a five-day training seminar conducted by a contracted facilitator. The facilitator exposed the improvement team to the concepts of process and data modeling, and provided a basic understanding of how to use the IDEF0 and IDEF1X modeling tools. Following the training, the team developed the process model. The modeling efforts were difficult because team members were not released from their regular duties to be part of the team. Additionally, the contracted facilitator was available only on a part-time basis. As a result, questions on how to use the modeling tool were not readily resolved.

These limitations resulted in a process model for the Request and Schedule Training business process, which was not very detailed. Appendix B shows the first level decomposition diagram for the sub-process, consisting of: Determine Customer Requirements, Process Request, and Notify All Concerned. Due to the geographic separation of the involved sites, NWS, Concord, and NSWCDD conducted modeling apart from the HRO-CC team, coming together only briefly to develop the AS-IS model; this may account for the cursory model they developed. Following the generation of the process model, and due to project time constraints (exacerbated by a late project start), generation of the data model using IDEF1X was not conducted.

As the improvement team moved to the analysis phase of the project they discovered that, because facilitation was very limited and focused solely on process and data modeling, the team believed themselves to be unprepared to conduct the Activity Based Costing analysis. Unlike the DLA project, there is no evidence that process flow analysis was performed. Without ABC, process flow analysis, or benchmarking, the process modeling team relied on expert validation to assure that it accurately depicted the current business process. The team seemed instead to do its own validation and then develop improvement alternatives that concentrated on automating the existing business practices.

Automating would remove some of the redundancy of the processes, and shorten process times; however, by not looking for more inventive solutions, the team had achieved very little real improvement. This point will be revisited in the following section. In creating the TO-BE model, the team changed very little of the AS-IS model.

This point is demonstrated by a cursory comparison of the first and lower level decomposition diagrams in Appendix B.

3. Comments

The HRO-CC managed project had many substantive shortcomings in the following areas, those stemming from a lack of training, those due to a lack of understanding, and those fostered by a lack of time or attention.

The team's inability to conduct ABC analysis is one indication that the training for this project may have been inadequate. Another is a lack of experience with the IDEF0 modeling tool that made it difficult for the team to make quick changes, thereby hampering the strength of the tool to spark interaction among team members. Had a full-time facilitator been available, it might have been possible to recover from the improvement team's lack of experience and training.

The team's lack of understanding regarding what was possible with process modeling was an important contributor to the limited improvements made in the process. By modeling the sequential steps of the business process, and not the activities performed or the mechanisms involved, the project generated a process model that revealed no substantive insight into the current business process. Also, by not combining apparently identical activities (A232 and A33) in improvement alternatives, the project achieved no consolidation of effort or simplification of the process. Lastly, by seeking to automate, rather than improve, the project appears to propose an alternative that automates a poorly designed process.

Automating a poorly designed process is harmful in two ways. It does not result in much of a payoff. In the HRO-CC example, it is questionable whether the benefits from the chosen alternative exceed the project cost. Second, automation can allow a bad process to be done more efficiently so significant improvements to the business process may be inhibited in the future. If, for example, HRO-CC's current automation improvements result in a significant reduction of processing time for requests, they may not recognize a need in the future for fundamental change in the automated business process (one example such a change is a "triage" system as discussed in *Reengineering the Corporation* by Hammer and Champy).

Finally, shortcomings were also the result of a lack of attention by the team members involved in, and sponsors of, the project. This is shown in two ways. First, priority was not placed on completing the project requirements, such as developing an FEA on the chosen improvement alternative. Second, HRO-CC was heavily involved in the DCPDS project. They provided five team members for this project, one of them being the project manager for the NISMC pilot project. The effect of this lack of attention is that very little effort was contributed to the NISMC project by team members and sponsors.

D. CORPORATE USE OF THE FPI METHODOLOGY

1. Application of FPI in Corporate America

Because they incorporate sound managerial practices, many aspects of the FPI methodology are fully accepted and used by private sector firms. For example, strategic

planning is (in its simplest forms) used by a manager to determine where the organization should be in the future. Benchmarking is used to scan the competitive environment to see if clues are available for how best to reach that future. Building a business case allows the manager to learn whether the risk or cost associated with reaching that future goal outweighs the benefits expected.

When it is asked if private sector firms use FPI, conceptually it is clear that they do. The question still remains, however, whether they use the specified ABC method and IDEF tool set. ABC is based on the concept of unit costing, and in this respect much research critically examining unit costing's strengths and weaknesses has been conducted, and therefore is not of interestto this thesis. What is important to a process improvement methodology, though, is that the determination of current costs be made in some fashion. Basing these costs on individual activities, and their costs per output, is an acceptable approach to achieving this end.

Turning next to the IDEF tool set, there is some interest within Corporate America in using the IDEF tool set. General Motors Corporation provides such an example.

2. Reengineering the Engineering Process at General Motors Corporation

General Motors has sought to significantly improve its business operations since the mid-1980s. One of the means of doing this has been through the use of the IDEF tool set to model and assist in substantive changes of business processes.

a. The EPIC Project

Through a major improvement effort titled the Engineering Process Improvement Commitment, or EPIC (established in January 1990), GM has explored suggestions for improving the Chevrolet-Pontiac-Canada (C-P-C) engineering process. The C-P-C, established in a corporate reorganization in 1984, is one of the two groups that comprise GM's passenger car divisions. When GM combined these divisions it discovered that although the business systems had been modified to meet the needs of the newly combined organization, the underlying business processes were still the same. To address this, GM created the Engineering Business Systems (EBS) Department, but EBS was too slow to support changing business needs. It was then that GM founded the EPIC project.

EPIC's charter was to "Optimize the C-P-C Engineering Process and the Supporting Business Systems." [Johnson, 1991] It was decided to accomplish this, EPIC would rely on IDEF0 process modeling along with consulting from WIZDOM Systems, Inc.

The basis for this decision was a mixture of project requirements and facts relating to the culture of C-P-C:

"1. There were too many functional areas within C-P-C and a flat representation would be unintelligible.

2. There was a visible hierarchy structure between functions.

3. One of the primary downstream objectives was to create an Operations Flow Model of the Engineering Process. There was thus, a need to identify functions at a sufficiently low level of detail.

4. The modeling team comprised experts, each with specific knowledge of a section of the organizational functions. Hence there was a need for a modeling methodology which could integrate independent modeling efforts into a composite whole.

5. The flow between functions in the engineering organization constituted both material and information.

6. Since, a resource analysis of the AS-IS was anticipated, there was a need to model the personnel and systems responsible for executing each function.

7. Anticipating a large number of functions, an automated modeling tool was deemed necessary." [Johnson, 1991]

GM believed that IDEF0 could meet or exceed all of the requirements it envisioned for the project.

b. Conduct of the Project

The EPIC project commenced with a two-day training seminar for the 13 members of the improvement team. This seminar consisted of instruction in the IDEF0 methodology and the tool provided by WIZDOM Systems, Inc. Following the seminar, team members jointly developed the context diagram for C-P-C Engineering Process. The purpose of this modeling effort was defined as: "Understand Current Practices & Systems & Identify Areas of Improvement," while the agreed on viewpoint was that of V.P. & Group Director: C-P-C Engineering. [Johnson, 1991]

Throughout the following three months, members of the EPIC project were divided into six groups. Each of these groups developed a process model for a single business practice uncovered in the context diagram modeling effort. The members would meet once a week to compare notes and correct discrepancies. After developing

the AS-IS model, the project team used the lowest level activities to construct a process flow diagram.

From analyzing the process model, and process flow structure, GM identified 148 specific improvement opportunities. To act on these opportunities, GM divided their improvement efforts into two main thrusts. The first used "root-cause analysis" to explore the 148 improvement opportunities. "Root-cause analysis" (RCA) is in many ways similar to troubleshooting techniques for engineering systems. The team would start with a noticeable deficiency in the process and try to decide what activity is causing the observed defect. Within the activity, the team would attempt to isolate the cause to a sub-activity, and so on in this fashion until a very specific cause is discovered for the effect noticed in the overall process. An example of this type of analysis can be taken from golf. If a golfer hits a poor shot he or she might first isolate the cause to an area of the body such as the hands. From here further isolation might focus on the golfer's grip of the club. Adjusting his or her grip on the following swing may have a dramatic effect.

This example shows that with RCA it is assumed that a single, major cause with possibly very minor supporting causes can be discovered. If this is not so (e.g., the golfers next swing is just as poor), RCA may have little effect. For a more detailed discussion of RCA, the reader is referred to *The Memory Jogger Plus: Featuring the Seven Management and Planning Tools*. [Brassard, 1989]

The second focus of the EPIC project was to be the development of a reengineered TO-BE model for the C-P-C group. Up to May 1992, EPIC had failed to

make any progress in establishing the TO-BE model. Faced with this, GM redirect the EPIC project to help other improvement initiatives. EPIC performed this function well based on the detailed knowledge it had developed concerning C-P-C business processes while using the IDEF0 process modeling tool.

c. Comments

GM believed that the use of the IDEF0 process modeling tool was specifically suited to help in process improvement and not just as a means to develop detailed models. Interestingly enough, Howard McCleary of Boeing, a former member of the national IDEF Users Group steering committee and currently involved in process modeling at Boeing Corporation, says that what IDEF is useful for at Boeing is the development of detailed AS-IS models. He adds, it is not useful as an improvement model without some additional process analysis tool. [Telcon, McCleary, 1994] The Defense Logistics Agency case study supports this point.

GM also shifted from a focus on reengineering the C-P-C to continuous improvement. The shift is summarized by a quote from the GM report before the IDEF Users Group: [Our new improvement effort] "has provided the foundation for full enterprise improvements; it has motivated and involved the organization. Improvement of enterprise business procedures [the original intent of the EPIC project] is, however, very complex." [Johnson and Odell, 1992] This shift is supported not only by the lack of success of the EPIC project in developing the TO-BE environment, but also by EPIC's documented success using root-cause analysis to make continuous improvements.

One possible reason for GM's failure to establish a new TO-BE environment might be found in the purpose and viewpoint used in the creating of the AS-IS model. GM's purpose was to increase the understanding of the current environment, and it apparently accomplished that goal. In doing so, GM may have modeled a system so large that it cannot be improved in one effort. If this is so, DoD could learn much from reviewing this effort in greater detail. Furthermore, the viewpoint of the model was that of the senior person in the division. Supporting the contention above, modeling from this macro viewpoint may have eliminated possible innovative options from being considered.

The degree of success in GM's application of the IDEF tool set is inconclusive. Clearly, research should be continued to establish more conclusive results. On the one hand, the fact that a company the size of GM uses the IDEF tool set means that DoD is not the sole customer of IDEF-based software products. On the other hand, the lack of an example where IDEF has significantly contributed to the success of reengineering efforts suggests that the FPI methodology may not support DoD's needs. This question is discussed in the following chapter.

IV. METHODOLOGY WEAKNESSES

The Functional Process Improvement methodology, specifically its use of the IDEF modeling tools, may have significant limitations when used for process improvement. Professor Sibley of George Mason University (who recently assisted in a review of improvement efforts in the DoD), commented that IDEF0 is burdensome and focuses improvement efforts away from seeing the "big picture" by involving members in detailed model creation. [Telcon, Sibley, 1994] The comments of Mr. McCleary, a senior executive of the Boeing Corporation cited in the previous chapter, support this contention.

Yet by defining and analyzing current business practices, firms such as General Motors have found the IDEF modeling tools very helpful in identifying needed improvements. Based on the ongoing debate, there is no conclusive agreement about whether the FPI methodology, and more specifically the IDEF0 process modeling tool, is more or less useful than other methodologies for conducting process improvement. So the discussion continues.

Presented are three perceived weaknesses of the FPI methodology as currently established by DoD. The first of these is the overall investment in time, people, and other resources required to apply the methodology. The second is the degree of knowledge and training required to use this methodology effectively. The third perceived weakness is the possibility that the FPI methodology may introduce incentives that lead practitioners to focus on modest incremental improvement of business practices than, on significant redesign as originally intended by the CIM Initiative.

A. A TIME AND COST INTENSIVE METHODOLOGY

The NISMC guidance on FPI implementation states that "FPIP does not come cheap. It takes time, people, money, travel, training, facilities, equipment, software and probably some contractor support. An average project may cost approximately $100K-$300K and take approximately six months to complete." [DoN, NISMC, 1993] This estimate is based on the pilot projects that NISMC sponsored. In the case of the General Motors EPIC project, it is conceivable that the investment would have been at least two to three times more.

Based on the commitment of resources required, it is not surprising that NISMC would cite "patience" as an essential part of managerial commitment to any BPI project. The focus on managerial patience emphasizes that no useful product is presented to managers until after the business processes are modeled, and reviewed, and current costing data are collected and assigned. Reaching this point may take three and a half months, for example, as it did for the Civilian Personnel Training project. [Telcon, Buck, January 1993] Until the AS-IS model is developed, the improvement team cannot even begin to develop, let alone evaluate, improvement alternatives. For large systems this could take an additional three and a half months to develop. It cannot be said too strongly that FPI is a resource-intense methodology, using detailed exploration of the business processes that takes time to develop.

It may be for the above reason that no case has been found that followed the FPI methodology completely. Recall, neither the Civilian Personnel Training project or the

Defense Logistics Agency Consumable Item Management project used IDEF1X to generate a data model. GM also has yet to develop the TO-BE process model in the EPIC project.

Additionally, no successful case has been found that followed the FPI methodology solely, as shown in the EPIC Project's use of root-cause analysis to affect process improvements. Edward Whitman, the Assistant Secretary of the Navy for Research, Development, and Acquisition, comments on this point: "Success stories, when investigated for lessons learned, revealed FPI practices--as prescribed in the proposed DoD instruction and manual--were abridged, abbreviated and even ignored." [Whitman, 1993]

1. Exploring the Resources Required for Improvement

One of FPI's weaknesses is its software tool limitations. Whitman continues:

> Our experience indicates that we will need linked, automated tools (to move from process modeling, through data modeling and activity-based costing, to functional economic analysis) for any moderately large-scale functional process analysis. The tools available today are primitive, incomplete and poorly linked. [Whitman, 1993]

The lack of connectivity is exacerbated by the IDEF tool set method of extensively documenting the modeling efforts accomplished by the improvement team. This is shown by the emphasis placed on detailed decomposition and notation in the data dictionary and glossary of the developed models. While extensively documenting the modeling efforts allows for iterative review of work conducted, review takes time and increases project cost, especially without the support of a powerful integrated software tool set.

One effect of using a methodology taking a long time at potentially high cost is that managerial commitment to the project is easily shaken. Projects that generate no

identifiable product quickly can cause sponsors to develop a lack of confidence in the project's payoff. Based on a lack of confidence, funding might be reduced, facilitation withheld, or personnel withdrawn from the effort. The Civilian Personnel Training project presents an example along these lines. As demands were placed on the team members, they were no longer able to focus their attention on the improvement process. [Telcon, Buck, 1994]

The DLA project highlighted a second aspect of managerial commitment. The manager responsible for the project was the Deputy Commander of the Navy Industrial Support Center(NISC). By his involvement the project stayed focused and was supported when resource needs arose. The role of a senior manager personally interested in an improvement project is generally referred to in change management literature as a "change champion." The Deputy Commander at NISC even supported the improvement team when it recommended that his job be eliminated! [Endoso, March 1993] Arguably without this presence no significant change is possible. The limited results due to the lack of a change champion in the Civilian Personnel Training project would support this contention.

2. DoD's Corrective Action

Three efforts to reduce project time and cost have been initiated by government proponents of the FPI methodology. First, many software tools that support the methodology are available under contract through the Defense Information Systems Agency(DISA). These tools are lent to agencies conducting process improvement projects to help in reducing project costs. DISA also provides some technical support on the tool set that can assist the experienced improvement team in conducting process modeling.

Second, DISA has assisted the Department of Commerce in the development and approval of FIP standards 183 and 184 for IDEF0 and IDEF1X, respectively. These standards support DISA's efforts to increase process and data model reusability from BPI projects. Standardization and the establishment of the DISA Center for FPI supports the inherent reuse strength of the IDEF tool set by maintaining a model and case study repository. This will be discussed in greater detail in the following chapter.

Third, group modeling methods are being explored. Use of a groupware center, such as that housed at the DISA Center for FPI to develop models, reportedly can reduce process model development time from a few months to two or three weeks. Whether the time saved by using this asset outweighs the total cost of using the center depends on the specific improvement effort.

Besides reducing project time and cost by increasing the efficient use of the software tool set, DoD is also attempting to improve project management by incorporating proven techniques in implementation guidance. The NISMC *Functional Process Improvement Implementation Guide*, for example, devotes a chapter to project management, as well as guidance in the development of project charters and management plans. As previously noted, it is expected that DoD final guidance regarding FPI will also emphasize these aspects.

B. REQUIRES SKILLED AND TRAINED IMPLEMENTORS

In building a house, it is the skill and knowledge of the building team following a thoughtful plan that determines the quality of the final product. The best set of tools or

procedures can improve the process, but tools and procedures cannot replace skill and knowledge. What, then, are the skills and knowledge needed by an improvement team to conduct process improvement? If any two people experienced with process improvement were asked that question it would be highly probable that the answers would differ significantly. Nevertheless, it is very likely that the skills they specify would fall into three general categories.

The first requirement is a knowledge of the improvement process, the guidance provided from seniors, and an understanding of the underlying concepts inherent in process improvement. Chapter I and most of Chapter II address this requirement. The difficult portion is teaching improvement teams enough of the conceptual foundation necessary to affect process improvements without requiring a graduate level education. For example, cost/benefit analysis as incorporated in functional economic analysis can conceptually be understood in a short amount of time, but conducting a risk analysis for improvement alternatives based on a prediction of customer demands for a new computer system, for example, requires a more sophisticated knowledge of an organization's specific area of business.

The second skill required is expertise with a specific tool set. To explore any software product's features and gain proficiency with its operation, time and energy is required. If the tool is to generate a valuable product, the improvement team must also have experience with the software tool, as well as knowledge of the process the tool supports. For example, a process modeler must understand the ICOMs in the modeled business process, also the software tool's mechanism for entering ICOMs.

Third, a team must possess an ability to be creative and envision modifications to current business practices that will have significant effects. This is more easily stated than accomplished, because creativity cannot be "taught" like the other aspects of applying the FPI methodology. As an improvement team seeks innovative improvements they draw on their own expertise and knowledge or they must look elsewhere. Facilitators can fill this role, at an additional cost. Tools such as root-cause analysis and critical path management can also guide an improvement team this raises the premium on knowledgeable and experienced process improvement specialists.

The weakness outlined above is not necessarily limited to FPI and its established tool set. Despite the degree that this limitation exists in other methodologies, however, it is an issue that must be addressed in the case of FPI.

1. Why There are no Skilled and Trained Implementors

For DoN, in particular, Assistant Secretary Whitman agrees this problem exists when he states: "Few Department of the Navy information systems people and no DoN business managers are experienced in using the modeling techniques prescribed by the Director of Defense Information, and we have been unable to achieve successful results by hiring competent contractor facilitation at an affordable price." [Whitman, 1993] The same would be true for any DoD activity until knowledge and experience with the methodology is developed. Since FPI is a relatively new methodology, with emphasis placed on supporting large-scale, DoD-wide, improvement efforts, it is not surprising that DoD components would not as yet have local skilled and trained implementors.

A second reason for this shortage is that the detailed analysis called for in the FPI methodology requires people with expertise in its application. Implementors must know the conceptual foundation of FPI, as well as possess experience in its application. Due to the high corporate demand for people with these skills, DoD employees trained in these skills may tend to leave their government position for more lucrative employment in the private sector. This is true in the four NISMC pilot projects, where one program manager and two team leaders of improvement efforts were hired by contractors to facilitate future improvement projects.

The rigorous modeling used in the FPI process does not fully alleviate this concern. While rigorous modeling should to provide a detailed set of models when their creators leave due to separation or transfer, to understand and use these models requires knowledge of the method and experience with the tools that generated the models. As presented above, this knowledge base in most DoD components is not very deep.

A third reason for an undeveloped corporate knowledge base is the need for training in the FPI methodology at multiple levels, as stated by Assistant Secretary Whitman. Managers of FPI improvement projects, like managers of any program, require a knowledge of the overall process and an understanding of the results expected. Without this, managers are unlikely to support teams when costs increase or delays occur.

2. Establishing the Corporate Knowledge Base

In an attempt to reduce skill requirements, DoD has focused on establishing a standard tool set so that knowledge and skills are portable between projects and agencies. In this effort the FIP standards for IDEF0 and IDEF1X also help in making developed

models portable among competing vendor products. Besides standardizing the tools, specific guidance in standardizing the improvement process has been developed (as presented in Chapter II). Like any standardization, so far as the standards chosen assist teams in conducting improvement projects they are beneficial; if, on the contrary, they interfere, or projects follow the letter and not the spirit of the guidance, standardization can become counter-productive.

In an effort to overcome the lack of trained and experienced personnel, contracted facilitators are regularly used to help in improvement efforts. A facilitator can assist in all aspects of FPI. One specific area where this assistance is usually cited is in the development of the process model. This gives teams a consultant who is interested in developing the final product; without this, one interviewee stated, "the modeling session can get hung up on the position of a comma in the glossary." [Interview, Haga, 1994]

Using facilitators also gives DoD personnel the chance to "watch and learn" how BPI projects should be conducted. Efforts to incorporate the facilitators knowledge into DoD have been and continue to be explored. One current example of this is the CADRE 100 project. As the name implies, the purpose of this project was to certify a cadre of approximately 100 individuals as business process improvement professionals. These professionals could then be used in teams of four to conduct or help in improvement projects. Candidates were selected in 1993 and received partial training along one of the four improvement professional tracks:

1. **Strategic Planning**
2. **Data and Process Modeling**

3. **Cost Analysis**

4. **Functional Facilitation and Coordination**

Members are trained in an intense series of courses, typically taking about five weeks. Three and one half weeks of this training is identical for all four team members. Following this period, individuals receive training based on the track in which they are concentrating. By training team members who have a thorough knowledge of the FPI methodology, in addition to skills in important sub-specialties, DISA believes the results will be more effective process improvements. [Storms, 1993] The project is still evolving, and so it is unclear at this point whether it will succeed where previous efforts have failed.

Many viewpoints are available as to the ability of DoD to maintain a useful consultant base for BPI projects. One aspect is whether DoD can develop incentives that limit the number of trained individuals who seek employment elsewhere. Another concern is how DoD can best use a cadre of FPI experts. Should they be managed by their "home" agencies, or be brought under the direction of DISA for the greater good of DoD? As the CADRE 100 program develops, these concerns most likely will be addressed.

In regards to educating and training people in various levels of detail, the NISMC guidance addresses this concern and believes it is best attacked by various tracks. Improvement team members would receive a detailed track in the methods and tools of FPI before initiating process improvement projects. This is similar to the CADRE 100 Program but in a much abridged form. For the general line manager the NISMC *Functional Process Improvement Implementation Guide* should suffice. For executive-level managers a presentation giving an overview of the methodology might be used.

Information Technology Center, Concord developed one such presentation to support NISMC's efforts.

C. THE FPI METHODOLOGY MAY HAVE THE WRONG FOCUS

1. Business Process Reengineering (BPR) According to Hammer and Champy

The dominant theme in *Reengineering the Corporation* is the reinvention of the business process. So important is the inventing of new processes as opposed to fixing the old that Hammer and Champy suggest failure to do so will result in the inability of the organization to compete in the changing marketplace.

Business Process Reengineering (BPR) is defined by Hammer and Champy as "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed." [Hammer and Champy, 1993] They stress that the "linchpins" of this definition are the words fundamental, radical, dramatic, and processes. Each signifies important implications for managers seeking to employ BPR to improve their organizations:

- **Fundamental:** BPR requires examination of the organization at its most fundamental levels to determine how the organization functions. Such examination requires defining basic components such as inputs, outputs, processes, data, customers, and costs to realize what makes the organization "tick."

- **Radical:** Once the traditional processes are understood and improving processes are recognized, radical change must be implemented to effectively root out the old and usher in the new. Here Hammer and Champy stress the importance of wholesale abandonment of the old ineffective processes, and the full acceptance and implementation of the new and improved processes.

- **Dramatic:** Organizations that adopt BPR to effect process change should do so with the expectation that quantum leaps in performance will be achieved. These dramatic results differ significantly from the incremental (e.g., 10%) improvements sought by organizations involved in improving old processes.

- **Processes:** Processes are the activities that take an input and create an output that is of value to the customer. Processes are where the improvements are effected in order to improve an organization's operations. [Hammer and Champy, 1993]

2. How does FPI relate to BPR?

Can the FPI methodology provide the kind of result that advocates of the BPR approach aspire to achieve? In reviewing Hammer and Champy's four key aspects of BPR, it is readily apparent how FPI relates to fundamental, radical, and dynamic process innovations.

FPI clearly supports the "fundamental" aspect of BPR. This strong support is an inherent strength of the FPI methodology. In regards to radical organizational change, however, it is debatable whether FPI can perform changes of this fashion. Emphasis in the FPI methodology on simplifying or consolidating business practices before automating has at its core the assumption that those processes will be maintained. Also, detailed cost/benefit analysis as in the development of a business case makes justification for radical change difficult. This is true because with radical change comes increased risk. Radical change also moves the organization into new territory in which it is hard to estimate, in advance, the likely costs and benefits (many of which are quite intangible).

DoD's approach to BPR, is more in keeping with the belief of Thomas Davenport in *Process Innovation*. Davenport argues that process innovation (BPR) takes a while to realize results (he estimates two to five years). Also, tools for accomplishing

Process Innovation are not yet useful. Because of this, Davenport believes, radical and dramatic changes to business processes should be avoided if a continuous improvement approach is more justifiable and the risks of innovation are not necessary to face. [Davenport, 1993]

This viewpoint leads into the third aspect of BPR, according to Hammer and Champy, that it should be "dramatic." An argument could be made that, due to cultural constraints and human resource difficulties when making complex change within DoD, a vast majority of DoD BPI Projects would opt for the less risky, less dramatic, and less radical continuous process improvements. This, in part, is a focus of the recently conducted George Mason University review of FPI Implementation. [Gulledge, et al, 1993]

Maintaining improvements along process lines is also very much an emphasis of FPI. By developing a detailed AS-IS process model, improvement efforts are led to exploring the interrelationships between identified activities, thereby identifying current business processes. This may be the intent of FPI, but tool limitations affect the degree to which this occurs.

Figure 11 shows one company's approach to supporting the FPI methodology that is intended to produce radical and dramatic results. The GM EPIC project used this approach but was unable to move beyond Phase Three when attempting to develop the TO-BE model.

3. Maintaining an Innovative Focus

The WIZDOM Systems methodology is structured to allow for BPR, but what must be present for an FPI improvement project to have these results? Three critical

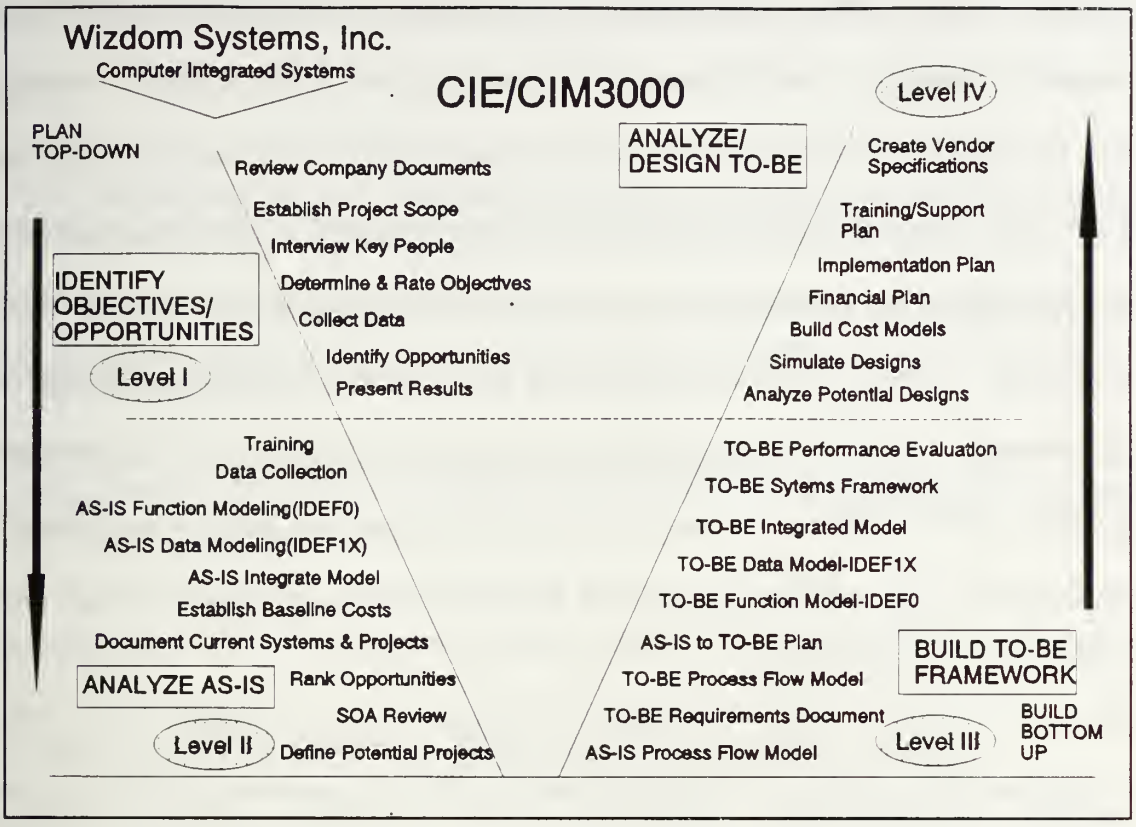

Figure 11 CIM3000 Project Plan, by WIZDOM Systems, Inc.

elements are required.

The first, as cited in the lessons learned from each of the four NISMC sponsored pilot projects, is the availability of a full-time contracted facilitator. [DoN, NISMC, 1993] Arguably this need will diminish as DoD increases its corporate knowledge of the methodology and expertise with the tool set. A facilitator can provide the expertise needed to use the tool set effectively, and also help in developing the project scope and charter. By maintaining focus on the project mission, a facilitator can move the group beyond being content with finding only the "low hanging fruit" of 10% process improvements.

The second required element, is the presence of a competent, supportive, and aggressive manager. This reinforces a point made previously that a "change champion" can be critical to improvement efforts. The champion here performs two major tasks. First, he or she supports the facilitator and improvement team by providing the resources it needs to produce a quality product. This emphasizes that the improvement effort is important. Second, the manager receives the developed, analyzed, and approved improvement alternatives and puts them into practice. This shows that the manager's support of the improvement team was directed toward the goal of improving the performance of the organization's current business practices, and that the groups efforts were not invested in vain.

The third requirement is that information technology (IT) must be used to re-invent -- not just improve -- business processes. Contrasting the Civilian Personnel Training project to that of the DLA project supports this contention. DLA emphasized the importance of IT in achieving bold results by believing "state-of-the-art information systems, consisting of shared, integrated databases, decision support systems and automated application systems must be developed to handle an increasing amount of work. The pace of developing and implementing new automation must be increased." [DoD, DLA, 1992] By applying IT to dramatically reinvented business processes, the developed improvement alternatives have the potential to radically change the current DLA business environment.

BPR is not a panacea, though. Hammer and Champy present a framework for why BPR must be conducted, but do not provide the means of achieving desired results. Addressing this aspect, Davenport presents the risks of BPR, and a means of carrying out

BPR concepts by focusing on "enablers" to Process Innovation (BPR). The three enablers are:

1. **Information:** Any use of information that changes the ability of those receiving the information to service customers or perform in more efficient manners.

2. **Information Technology:** Any technology that changes the organization's system or processes. An important aspect of this is the use of technology must be used as a means to an end and not as an end in and of itself.

3. **Human Resource Management:** The effect (negative as well as positive) that the organizational culture or worker characteristics and traits have on assisting or detracting from process innovation (BPR).

Davenport goes as far as saying that if these enablers are not present process innovation should not be attempted. Any manager attempting radical and dramatic process change using the FPI methodology could assist those efforts by considering the presence or absence of these enablers.

The weaknesses presented above are significant, and DoD is addressing each of these in one way or another. The above arguments aside, the FPI methodology does possess some inherent strengths which make a review of this methodology worthwhile. These strengths are discussed in the following chapter.

V. METHODOLOGY STRENGTHS

Although no clear concensus exists about the merits of the FPI methodology, three characteristics appear to stand out as its most significant strengths:

1. detailed decomposition of current business processes is effective in uncovering improvement opportunities.

2. products generated when using the FPI methodology are reusable in future improvement projects.

3. the FPI methodology incorporates sound managerial practice that supports other DoD management practices.

A. MODELING THE BUSINESS PROCESSES

1. What IDEF0 Provides

For General Motors, the process flow model (developed using IDEF0) "..provided for the first time a true understanding of the engineering process." [Johnson, 1991] This statement brings to light two key factors contributing to IDEF0's strength as a modeling technique. First, IDEF0 provides a graphical depiction that can aid significantly in increasing the understanding of current business practices. By doing so, IDEF0 allows people who are relatively unfamiliar with process modeling to make substantive comments. Model developers also benefit from the continuous review and critique of their work. This review and critique foster an increased understanding of the process being modeled. To provide this benefit in improvement projects, the models

must spark conversation and possess a means for capturing what is discovered. IDEF0 may arguably be cumbersome, but it does meet that requirement.

Second, IDEF0's detailed definition of the business process assists in identifying deficiencies. This supports the adage that "a problem well defined is half solved." As presented in the previous chapter, use of IDEF0 does not by itself lead to a reengineered business process. Instead, the studies discussed suggest IDEF0 can readily identify improvement opportunities.

Combining these two factors yields a tool that helps identify inefficiencies in current business processes and provides a means of discovering remedies. An example from the DLA project illustrates the point:

> "...the business as currently performed, is missing a common integrated focus and common measures. The AS-IS model shows that everyone does everything. Functions and sub-functions work toward sub-optimized goals and targets, at times in conflict with or to the detriment of other functions. Most functions are reactive rather than proactive." [DoD, DLA, 1992]

Following this realization, DLA acted to develop innovative alternatives to break down the walls among its "stovepipe" systems.

2. Why This is not Provided by Other Tools

Is IDEF the only answer? Pat Duran (President of Eclectic Solutions Corporation) presented many arguments why IDEF0 is better than Structured Analysis (SA). Duran begins by first acknowledging that "[t]here are many similarities between IDEF and SA. Both use top down hierarchical graphic models. Both take an iterative approach with incremental improvement. Both stress the extensive involvement of

subject matter experts, including frequent reviews. Both emphasize understanding *what* the system must do before deciding *how* it should do it." [Duran, 1992]

Duran argues that despite their similarities, direct comparison of the two methods show many significant advantages of IDEF0. One is that Data Flow Diagrams (DFD) -- the product of SA -- cannot display or express controls and mechanisms. DFD's only display flow of data, storage of data, and the activities that respond to and change data within a process. [Whitten, et al, 1989] Understanding the controls and mechanisms of a process can provide vital insight into developing improvement alternatives.

IDEF0's second advantage over DFD's is that relationships between activities are more readily apparent. The use of data stores in DFDs can obscure relationships between activities. For example, if two activities use data from the same data store it can become very unclear which activity is "down stream" of the other. Duran presents this point quite effectively (see Figure 12). Understanding activity relationships can be vital when considering improvements to activities contained on a single decomposition diagram. It can also provide insight when conducting process flow analysis as in the DLA study. The Civilian Personnel Training project failed to properly use this benefit.

A third advantage of IDEF tool set compared to other modeling techniques is that the concept was developed by the U.S. Government. Because of this, IDEF is non-proprietary, and therefore many vendors are free to provide tools that incorporate the IDEF methodology. Although the specific tools must still be bought or leased, DoD believes that the non-proprietary nature of IDEF fosters competition among vendors,

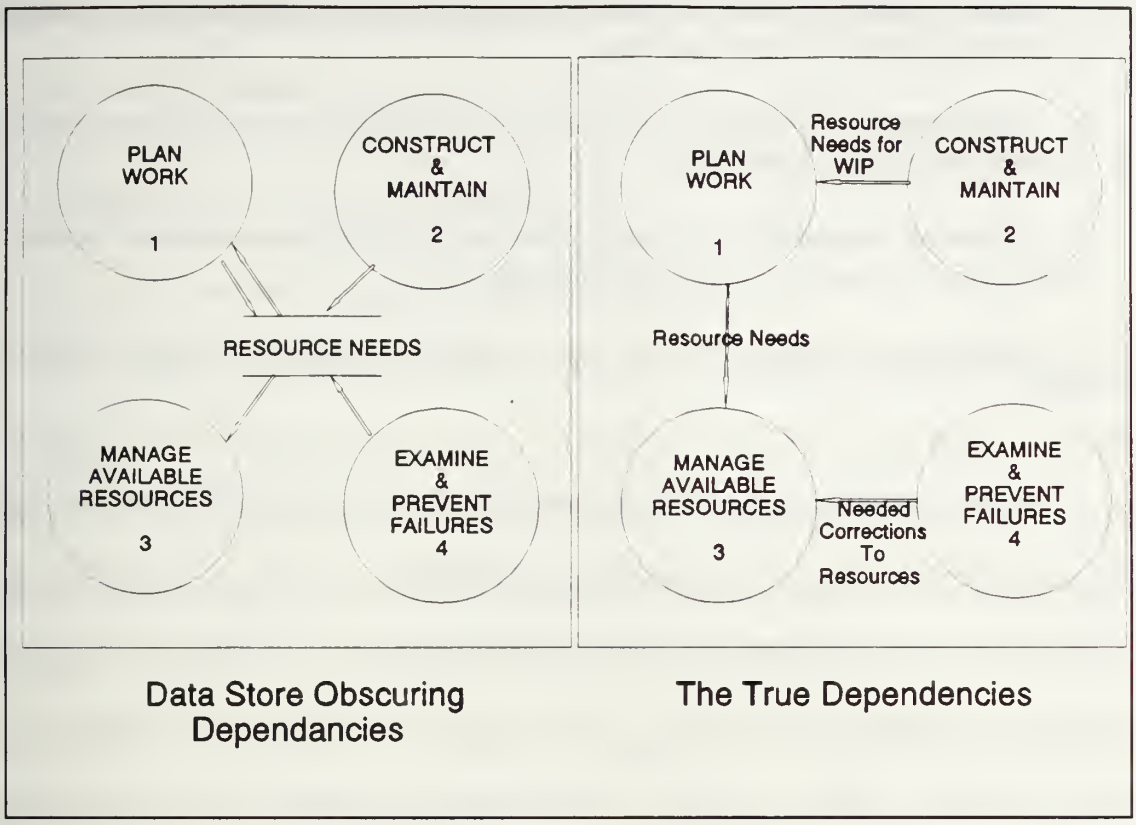

Figure 12 Effect of Data Stores used in Data Flow Diagrams [Duran, 1992]

thereby improving the quality of the tool sets available. The establishment of Federal Information Processing (FIP) standards further support DoD's efforts to standardize all improvement efforts around a single methodology. This standardization eases the development of a corporate knowledge base that is portable throughout DoD.

B. THE DISA CENTER FOR FUNCTIONAL PROCESS IMPROVEMENT

To take advantage of IDEF's reuse potential, DISA in September 1993 opened the Center for Functional Process Improvement (CFPI). The DISA CFPI is designed to provide four key support functions to conducting FPI projects:

1. **Tool Access:** Includes the IDEF tools previously mentioned and the FEAM operating on a Microsoft™ Excel base.

2. **Benchmarking Assistance:** Assistance in identifying the best business practices currently being used in the field.

3. **Access to Repository:** Repository contains over 100 process and data models, as well as case studies on previous BPI Projects.

4. **Groupware Center:** For team use in process modeling. [Endoso, September 1993]

Models are stored in the Defense Data Repository System (DDRS) and accessible via an online Data Base Management System (DBMS). Access is restricted by user identification codes and passwords. This restriction assists the configuration management system in maintaining each model. Additionally, IDs and passwords are only given to users after they complete a three-day training course regarding the repository system. By controlling IDs and passwords in this fashion, DISA has assured that only experienced and knowledgeable users have access to the system.

The benefits of reuse are readily evident. With reuse, the team need only validate the model and correct for any local implementation anomalies. IDEF supports this effort by using a rigorous and standardized development process, a detailed text description of each level of the model, and a detailed glossary of terms used in the model. All the benefits previously discussed regarding benchmarking are also applicable to model reuse.

Currently, use of CFPI has predominantly remained within DoD, although corporate access is allowed (following completion of the required course). As the

program matures and more repository sites are created, use in public and private sector will most likely increase.

C. DEVELOPING THE BUSINESS CASE

1. Theoretical Strengths of the Business Case

Chapter II presented a brief description of how to use Functional Economic Analysis to develop the business case. To briefly recap that presentation, the three strengths of the business case are: first, the business case allows the manager to compare competing alternatives on a common economic foundation; second, it emphasizes proper managerial planning before carrying out approved improvement alternatives; and third, the business case provides a means of measuring an implemented alternatives performance against what was expected.

The *FEA Guidebook* was developed on the belief that incorporating these strengths into process improvement decisions will result in more efficient DoD business processes. Improving DoD business processes is the goal of the CIM initiative; FEA, as a product of the FPI methodology, is the tool used to achieve this end. The following excerpt from the *FEA Guidebook* illustrates how this "incorporation" occurs:

> [Figure 13] shows the sections of the FEA, as required by DoD 8020.1M. Note that the FEA document includes more than just the results of the cost analysis completed as part of the FEA process. It also summarizes strategic plans for the functional area and activity, reports on performance measures and targets, describes the functional improvement program, and outlines the supportive data management and information system changes required by the improvement program. The FEA document is designed to "carry" all the information needed to make good business decisions. [DoD, FEA, 1993]

Section	Contents
1.	Functional area strategic plan
2.	Functional activity strategic plan
3.	Performance measures and targets
4.	Improvement program
5.	Economic analysis
6.	Data management and IS strategy
7.	Data and system changes
8.	Data and system cost analysis

Figure 13 Sections of the FEA Document

By keeping the business case up to date, the FEA provides on going guidance and vision to current and future operations of an organization.

2. Current DoD Management Practices

The business case (specifically the FEA), is useful within DoD for many tasks other than conducting process improvements. Two major DoD management systems applying FEA are the Program Planning and Budgeting System (PPBS) and major system program reviews.

The PPBS is the system of policies and procedures that DoD uses to develop and document its mid-range plan, its mid-term resource program, and its near-term budgets. The resources that DoD has decided to apply to its various requirements are identified in various programs and budgets. The *FEA Guidebook* emphasizes the connection between PPBS and FEA by stating: "While the functional economic analysis is not a formal component of PPBS, there clearly must be a linkage between the two in order to ensure that approved FEA's (for DoD-level components) receive the resources required for implementation." [DoD, FEA, 1993]

Even on the installation-level, the FEA can be linked to the organizations budgetary submissions. At any budgetary decision point the FEA can provide a well-prepared and documented support of an organization's request for required funding. Such support can prove invaluable when defending improvement initiatives in an era of declining budgets and increasing competition.

The second area in which FEA is becoming more widely used is program management. Paul Strassman states the importance that DoD places on the FEA when he writes: "Since FEA is a new DoD methodology, implementation is being done on a phased basis as outlined in ASD (C3I) memorandum of 22 October 1992. Specifically, this memorandum calls for FEAs from a limited number of [Office of the Secretary of Defense (OSD)] organizations, but notes that this type of analysis will eventually be required of all OSD organizations." [DoD, FEA, 1993] One area where the FEA is already being used is in justifying programs such as major automated information systems, as they move through the Life Cycle Management (LCM) process. In fact, the final (or update) FEA is used at the program level in DoD as the basis for requesting appropriate fiscal action by ASD(PA&E) or the DoD Comptroller. DoD 8020.1M states this very explicitly:

> "The final FEA is the principle document in the approval decision package (for the overall process improvement alternative), and a part of the SDP (Systems Decision Paper)(for milestone review of the AIS-related parts of the process improvement alternative)." [8020.1M, 1993]

The FEA is a powerful managerial document that is finding increased applicability within DoD. As the FEA is used in other DoD management efforts,

maintenance and improvement of the FPI methodology and tool set may require significant attention. This will be discussed in the concluding chapter.

VI. CONCLUSIONS

A. RESEARCH QUESTIONS

Three significant conclusions are presented as a result of analyzing the Functional Process Improvement methodology guidance and field application.

First, while the discussion of FEA's connection to DoD management efforts highlights a significant strength of FPI, many experts in the field of process improvement still have doubts concerning the quality of FPI's underlying tool set. DoD supports the FPI methodology and has incorporated the FEA -- the end product of FPI -- into many of DoD's fiscal management programs. Therefore, it appears the first requirement of any modification to the methodology must maintain support for developing of the business case.

The current tool set (containing IDEF0, IDEF1X, and ABC) was designed with the express purpose of supporting FEA. The aim of efforts such as the CADRE 100 program is to improve this support. Because of DoD's support for the FEA as a managerial tool, any proposed replacement of IDEF0, IDEF1X, or ABC in the FPI tool set must demonstrate a significant improvement over current practices. If this cannot be done, DoD's resistance to modifying the methodology will be very difficult to overcome.

Second, review of the FPI methodology addressed some substantive weaknesses. Efforts such as the CADRE 100 program and the DISA Center for Functional Process

Improvement may be effective in countering these limitations, specifically by reducing the time and cost of improvement projects. As the first conclusion suggests, if IDEF0 is not an effective process modeling tool, but DoD still supports its use, the end result of DISA's efforts may be a good deal of wasted effort and resources. As FPI matures, research to support its evolution must continue.

Finally, the specific cases discussed in this work show that an improvement methodology may be useful in performing only part of the process improvement mission. Managerial practices incorporated into the FPI methodology, such as strategic planning and benchmarking, have made the method more robust; however, other areas, such as the human element in process improvement, have yet to be codified. Arguably, this may not be possible. If it is not, then whatever methodology is developed can greatly assist, but not replace, a knowledgeable and visionary leader who can motivate an organization toward a new horizon.

B. AREAS OF FURTHER RESEARCH

Many experts in the field of process improvement have voiced significant discomfort with using the IDEF0 process modeling tool. Research to find if a better process modeling tool exists, or if improvements can be made in the IDEF suite of tools is needed. Although, IDEF tool vendors are already pursuing some of these questions to establish a competitive edge, The Naval Postgraduate School, has experience with IDEF and, as a Navy's Reinvention Laboratory, is using a variety of methods for

conducting process improvement. Based on this knowledge and current mission, Naval Postgraduate School would be an excellent candidate for conducting this comparison.

A second area of research would be to compare the process and tools used in improvement projects using differing methodologies. A good candidate for this comparison would be contrasting a project using the FPI methodology with one using a Total Quality Leadership approach like that codified by the Department of the Navy. A study in this area might reveal whether TQL, with its foundation in the work of Dr. Deming, is compatible with all or part of the FPI methodology. Related to this would be a case study comparing the improvements made using FPI and those based on TQL to decide if either methodology holds a substantive advantage.

APPENDIX A

This appendix contains excerpts from the Defense Logistics Agency Consumable Item Management Business Process Improvement Project Final Report, published 25 Novemeber 1992.

The contents are as follows:

USED AT	AUTHOR : DLA	DATE: 10/29/92	X	WORKING	READER	DATE	CONTEXT
	PROJECT : DLAMINI	REV. : 11/17/92		DRAFT			
	COMPANY: WIZDOM SYSTEMS			RECOMMENDED			
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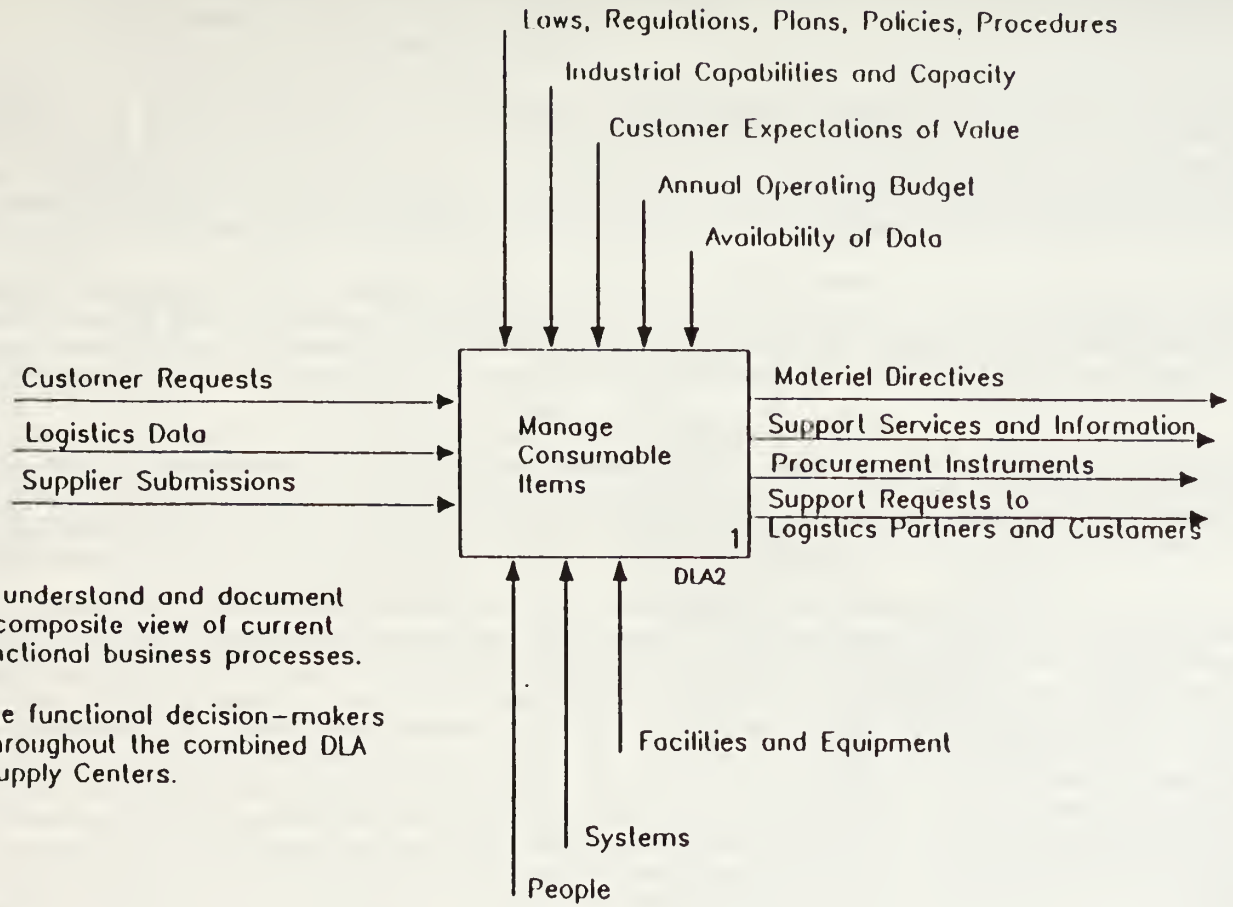

[1] PURPOSE: To understand and document a composite view of current functional business processes.

[2] VIEWPOINT: The functional decision-makers throughout the combined DLA Supply Centers.

NODE: AS-IS/A-0	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA1

USED AT	AUTHOR : DLA	DATE: 10/29/92	X	WORKING	READER DATE	CONTEXT
	PROJECT : DLAMINI	REV. : 11/17/92		DRAFT		
	COMPANY: WIZDOM SYSTEMS			RECOMMENDED		
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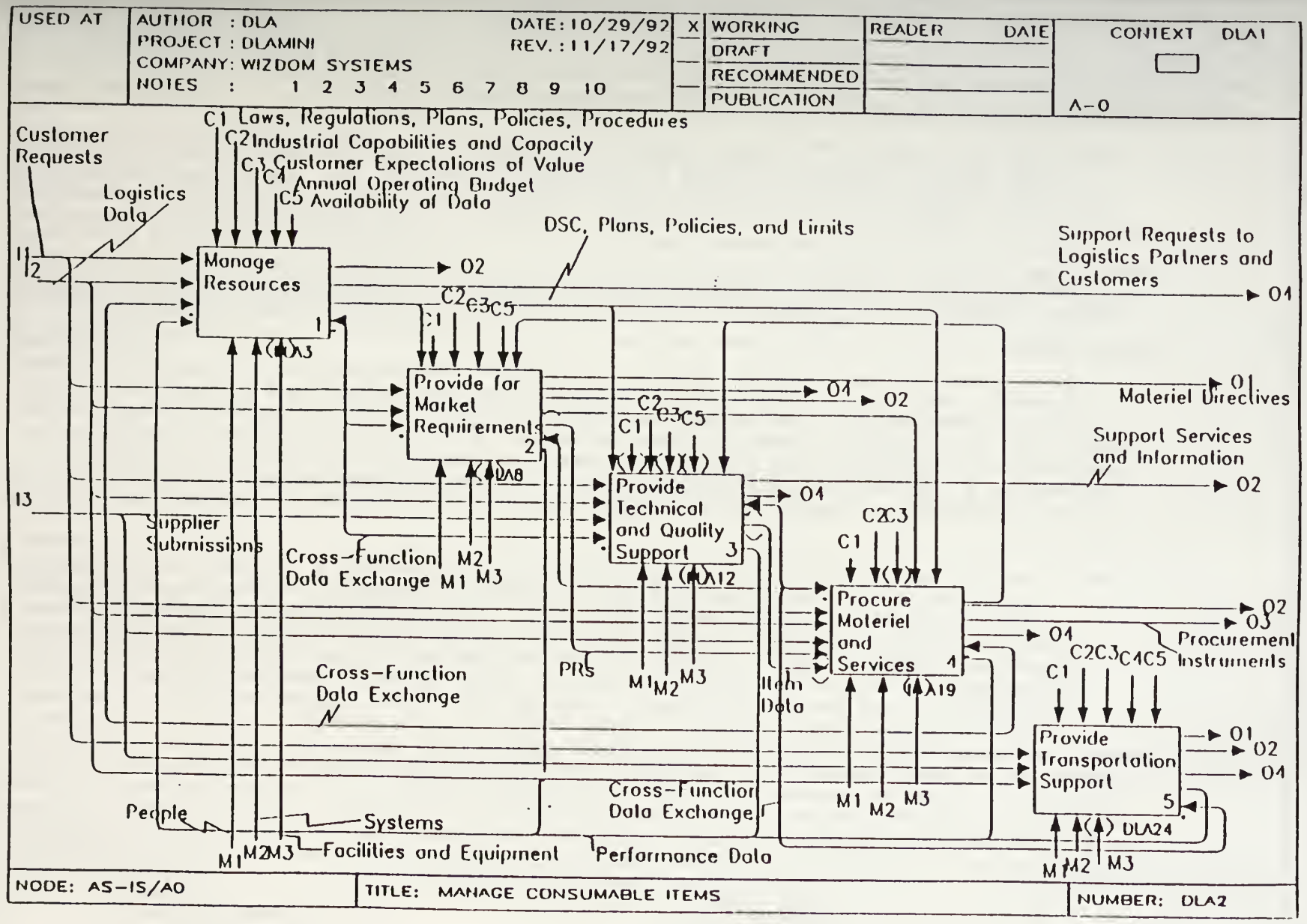
Managing consumable items in the DoD logistics universe is the function of supporting the military Services with many diverse items of a consumable nature. DLA currently manages three million consumable items. This is expected to grow to four million after completion of the consumable item transfer from the military Services to DLA. For this project, consumable items are defined as items of supply (except explosive ordnance, major end items of equipment and reparables) that are normally expended or depleted beyond recovery when used as designed or intended. The functions normally associated with consumable item management include item entry, requirements determination, management of assets, procurement of goods and services, and distribution of items. It is supply oriented verses maintenance oriented. Some functions can be performed independently, and others are very dependent and inter-related. In this modeling effort, we have confined the functions of the management of consumable items to those performed within the walls of a Defense Logistics Agency (DLA) Inventory Control Point (ICP) and did not include the major functions of accounting, mainframe data processing and distribution.

The major products of an ICP are service and information. The principle functions that are performed to deliver the products include: Munge Resources, Provide for Market Requirements, Provide Technical and Quality Support, and Procure Materiel and Services. In addition to its obvious fleet and unit customers, there is a significant effort expended to provide information to various stakeholders (e.g., Congress, DoD, DLA, and the Services), suppliers, Federal agencies, auditors, investigators, and other logistics agencies.

As indicated on the diagram, the purpose of the model is to understand and document the composite view of current functional business processes. It includes the uniqueness of each commodity and ICP. The viewpoint or perspective of the model is that of decision makers within the walls of DLA ICPs for all commodities except the Defense Fuel Supply Center. The viewpoint does not include DLA headquarters.

The consumable item commodities that are included in this project are managed by the four hardware ICPs (Industrial, Electronics, General, and Construction) and the three personnel related ICPs (Clothing and Textiles, Medical, and Subsistence). Characteristically, the hardware centers are commodity oriented as opposed to program oriented, and this also is the case with the Services ICPs. The commodity orientation drives how consumable items are managed within DLA. This results in a very transaction based system feeding complex work processes.

NODE: AS-IS/A-OT1	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA1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PROJECT : DLAMINI
COMPANY: WIZDOM SYSTEMS
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RECOMMENDED
PUBLICATION
READER DATE
CONTEXT DLA1
A-0
C1 Laws, Regulations, Plans, Policies, Procedures
C2 Industrial Capabilities and Capacity
C3 Customer Expectations of Value
C4 Annual Operating Budget
C5 Availability of Data
Customer Requests
Logistics Data
DSC, Plans, Policies, and Limits
Support Requests to Logistics Partners and Customers
Manage Resources
Provide for Market Requirements
Provide Technical and Quality Support
Procure Materiel and Services
Provide Transportation Support
Materiel Directives
Support Services and Information
Supplier Submissions
Procurement Instruments
Cross-Function Data Exchange
PRS
Item Data
Performance Data
People
Systems
Facilities and Equipment
NODE: AS-IS/A0
TITLE: MANAGE CONSUMABLE ITEMS
NUMBER: DLA2

USED AT	AUTHOR : DLA PROJECT : DLAMINI COMPANY: WIZDOM SYSTEMS NOTES : 1 2 3 4 5 6 7 8 9 10	DATE: 10/29/92 REV. : 11/17/92	X	WORKING DRAFT RECOMMENDED PUBLICATION	READER DATE	CONTEXT DLA1 A-0

The Manage Resources function was modeled from a command perspective and focuses on the management functions of planning and checking. It includes development and implementation of command strategies, plans, goals, objectives, policies, controls, and performance measures. The managed resources include: material, funds, people, systems, information, and facilities. However, the facilities and personnel management functions have been excluded from the model, because they are not considered to be directly related to the mission of materiel management. The Provide for Market Requirements function is the inventory management function of determining customer requirements and managing assets. It reflects support to the full range of customers (e.g., seamen, airmen, soldiers, and Marines). Provide Technical and Quality Support is the function of providing engineering /quality service and technical data to our customers. It includes the function of standardization, value engineering, management, breakout, quality, cataloging, and reliability. Procuring Materiel and Services is primarily the procurement function. It includes procurement from commercial suppliers and government sources. This large activity is highly regulated and includes the sequential process of taking a procurement request, soliciting suppliers, awarding a contract, and administering the contract. It does not include the post-award activity delegated to the defense contract management command.

Each function was identified because of its dominance in resource consumption, activity level and relative significant contribution to the mission/activity of managing consumable items at an ICP. It is viewed as a "stove pipe" and sequential operation where a function is performed independently by specialists, and the incomplete product is passed to the next function for more processing. The idea is that each function working within its specialty will achieve maximum effectiveness and efficiency, so that when combined with the other functions, we will have the most cost-effective and quality service. It is a non-integrated sequential process, with many independent entries of source data, and much effort expended in data reconciliation.

The graphic diagram is the logical array of functions as they are performed at the ICP. Given a strategic and investment plan, the next logical activity is to determine requirements to carry out the plan, combine them with item descriptions, and give them to the procurement function to purchase the items for ultimate stockage at a DLA depot. This sequence of activity is the most predominant solution used to satisfy a customer's materiel requirement; that is, forecast the requirement, buy the item, maintain the item, direct the issue of the item, and buy the replacement item. It is a recurring action that happens repeatedly in high volume within the ICP. The most telling characteristic in this diagram is how highly complex, iterative and data intensive the function of managing consumable items is. In simple, terms, the ICP is

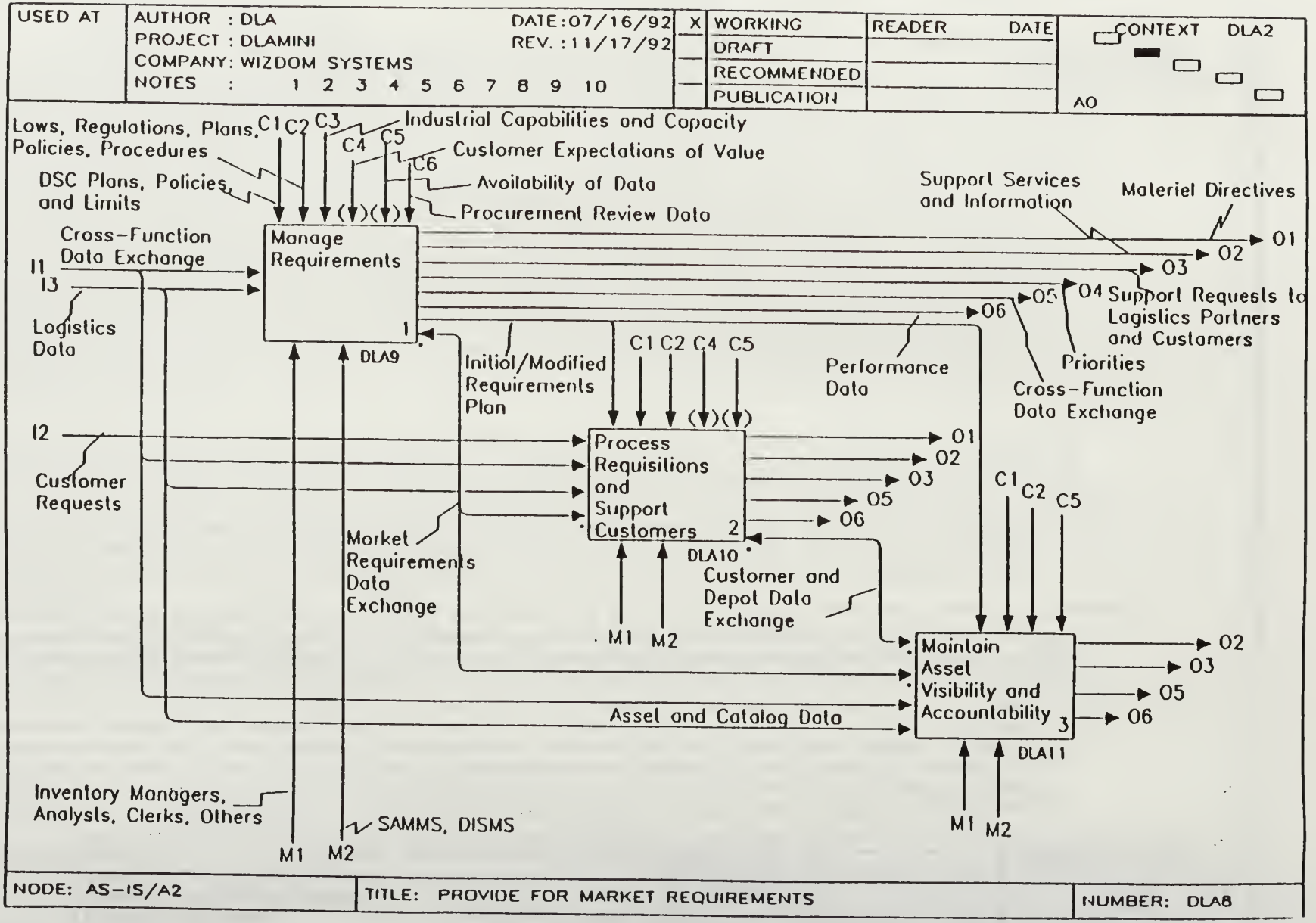
NODE: AS-IS/A0T1	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA2

USED AT	AUTHOR : DLA PROJECT : DLAMINI COMPANY: WIZDOM SYSTEMS NOTES : 1 2 3 4 5 6 7 8 9 10	DATE: 10/29/92 REV. : 11/17/92	X	WORKING DRAFT RECOMMENDED PUBLICATION	READER DATE	CONTEXT DLA1 A-0

a large center for processing data. All the input to the function is in the form of data as is the output. It is highly controlled by not only laws and policies, but also by operations budgets, availability of data, restrictions on capacity and even customer expectations of our service. Finally, there is a heavy volume of dataflow in and out of the function and among the subfunctions, and this flow is integral to the performance of the dominant functions.

The Provide Transportation Support handles development of transportation routes and carriers for DVD shipments, booking transportation where required and providing assistance related to transportation rates and requirements in support of materiel acquisition. This function is predominantly in support of the personnel commodities today, but will grow in importance as other commodities move more toward DVD support.

NODE: AS-IS/A012	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA2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AUTHOR : DLA
PROJECT : DLAMINI
COMPANY: WIZDOM SYSTEMS
NOTES : 1 2 3 4 5 6 7 8 9 10
DATE:07/16/92
REV. :11/17/92
X WORKING
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RECOMMENDED
PUBLICATION
READER DATE
CONTEXT DLA2
A0
Laws, Regulations, Plans, Policies, Procedures
DSC Plans, Policies, and Limits
C1 C2 C3 C4 C5 C6
Industrial Capabilities and Capacity
Customer Expectations of Value
Availability of Data
Procurement Review Data
Support Services and Information
Materiel Directives
Cross-Function Data Exchange
I1
I3
Logistics Data
Manage Requirements
1
DLA9
01
02
03
04
05
06
Support Requests to Logistics Partners and Customers
Priorities
Cross-Function Data Exchange
Initial/Modified Requirements Plan
Performance Data
I2
Customer Requests
Process Requisitions and Support Customers
2
DLA10
Market Requirements Data Exchange
Customer and Depot Data Exchange
M1
M2
Maintain Asset Visibility and Accountability
3
DLA11
Asset and Catalog Data
Inventory Managers, Analysts, Clerks, Others
SAMMS, DISMS
NODE: AS-IS/A2
TITLE: PROVIDE FOR MARKET REQUIREMENTS
NUMBER: DLA8

USED AT	AUTHOR : DLA	DATE: 07/16/92	X	WORKING	READER	DATE	CONTEXT DLA2
	PROJECT : DLAMINI	REV. : 11/17/92		DRAFT			
	COMPANY: WIZDOM SYSTEMS			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			A0

This function is central to filing customers' requirements. It gathers and assesses information about the projected uses of the items and translates it into support plans. Based on the plans, support is provided in response to customer requests. This function also includes subfunctions which provide the direct interface to the customer, performs administrative actions related to maintaining items in storage, and resolves customer complaints. While it is primarily comprised of activities associated with the Supply Operations organization, it also includes activities such as resolution of product quality complaints (PQDRs) which are performed in other current organizations.

The primary characteristics of this function are the volume of data and transactions which it handles, and the iterative nature of the processes. Over three million items are reviewed, forecasted, and accounted for in these processes. Nearly 28 million customer requests for items are processed annually. This results in over $18 million in billing transactions, 1.3 million procurement actions generated, as well as 24 million receipts, issues, and other accountability transactions. Because of this, the emphasis is on mechanized rule based processes which handle the masses of routine activity. Exception conditions are recognized early for manual action. The iterative nature of the function is expressed with two-way arrows as among all of the subfunctions. These carry volumes of routine information including demand data, asset status, and performance data which are used to evaluate and correct the plan or to execute the processes.

The first function, Manage Requirements, performs the planning for customer support. It also generates the initial actions, such as purchase requests, which provide the framework to execute the support plan. The planning includes such actions as deciding whether to stock the item, setting levels for support, and determining other management characteristics which constitute the rules executed by the mechanized system.

The second function, Process Requisitions and Support Customers, executes the support plan. It processes customer requisitions, applying the management criteria developed by Manage Requirements, deciding on the appropriate method of support from among the alternatives provided by the item support plan. It generates appropriate directives to ship the item from stock, or procure for direct delivery. This function also acts as the interface to the customer, answering requests for information and processing various sorts of customer complaints. Finally, it is the repository for all data related to requisitions, customers, and depots.

The third function, Maintain Asset Visibility and Accountability, Processes all actions related to the status of assets in storage or due-in. This is primarily a mechanized process with duplicate data being resident in various flat files. Significant resources are spent in this function reconciling duplicate data between center, depot and financial records, or between records and actual stock on hand or due-in.

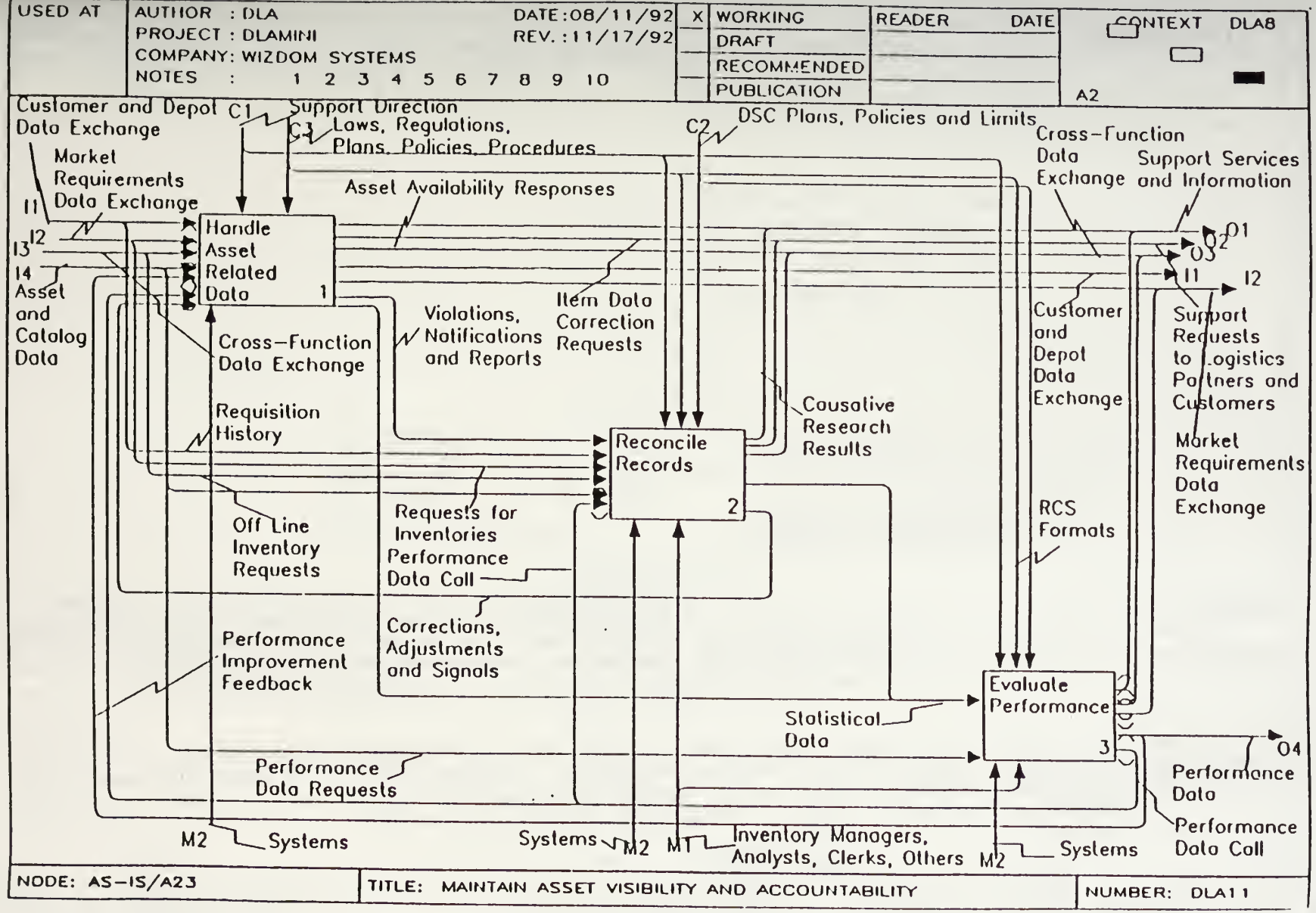
NODE: AS-IS/A2T1	TITLE: PROVIDE FOR MARKET REQUIREMENTS	NUMBER: DLA8

USED AT	AUTHOR : DLA	DATE:07/16/92	X	WORKING	READER	DATE	CONTEXT DLA2
	PROJECT : DLAMINI	REV. : 11/17/92		DRAFT			
	COMPANY: WIZDOM SYSTEMS			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			A0

or between records and actual stock on hand or due-in.

There are significant opportunities for business process improvements in this function. Elimination of duplicate data in different files would eliminate resources wasted in reconciliation efforts and improve the quality of data used in many functions. More flexibility in the mechanized systems would allow more innovation in support methods, reducing costs for holding stock in inventory. Better understanding of the resources available in the private sector would improve resource allocation decisions. Finally, more time could be spent understanding the needs and priorities of the customer, so that support could be tailored to those needs.

NODE: AS-IS/A2T2	TITLE: PROVIDE FOR MARKET REQUIREMENTS	NUMBER: DLA8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AUTHOR : DLA
PROJECT : DLAMINI
COMPANY: WIZDOM SYSTEMS
NOTES : 1 2 3 4 5 6 7 8 9 10
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PUBLICATION
READER DATE
CONTEXT DLA8
A2
Customer and Depot Data Exchange
C1
Support Direction
C3
Laws, Regulations, Plans, Policies, Procedures
C2
DSC Plans, Policies and Limits
Cross-Function Data Exchange
Support Services and Information
Market Requirements Data Exchange
I1
I2
I3
I4
Asset and Catalog Data
Handle Asset Related Data
1
Asset Availability Responses
Item Data Correction Requests
Violations, Notifications and Reports
Cross-Function Data Exchange
Requisition History
Off Line Inventory Requests
Requests for Inventories Performance Data Coll
Corrections, Adjustments and Signals
Performance Improvement Feedback
Performance Data Requests
Reconcile Records
2
Causative Research Results
Customer and Depot Data Exchange
RCS Formats
Evaluate Performance
3
Statistical Data
O1
O2
O3
I1
I2
Support Requests to Logistics Partners and Customers
Market Requirements Data Exchange
O4
Performance Data
Performance Data Coll
M2
Systems
Systems
M2
MT
Inventory Managers, Analysts, Clerks, Others
M2
Systems
NODE: AS-IS/A23
TITLE: MAINTAIN ASSET VISIBILITY AND ACCOUNTABILITY
NUMBER: DLA11

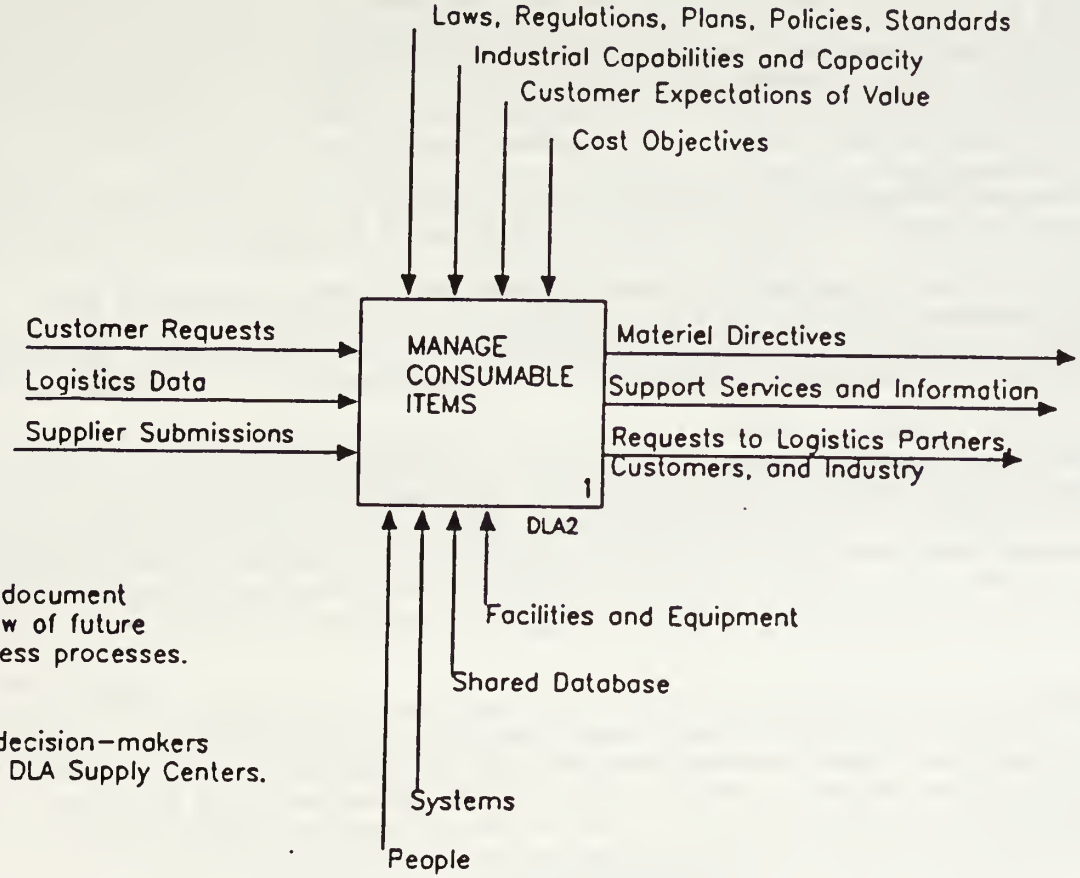
USED AT	AUTHOR : DLA	DATE:08/11/92	X	WORKING	READER	DATE	CONTEXT DLA8
	PROJECT : DLAMINI	REV. : 11/17/92		DRAFT			
	COMPANY: WIZDOM SYSTEMS			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			A2

This function collects, stores, categorizes, and displays data related to assets. It also devotes significant resources to researching and resolving data descrepancies between various files which hold duplicate asset data (e.g. accountable, financial, and depot records). This function includes review and problem resolution for other asset related data as dues-in and intransits. These may result from data incompatibility, missing data, or overdue shipments.

As noted at the higher level, this is a very data intensive function. Most of the activity is performed in the handle data function which has only systems as a mechanism. The other functions at this node represent the systems supported, manual operations needed to ensure data accuracy. Improvements made to the "Handle data" function which lessen data incompatibilities would be a significant business process improvement. The result would be reduction or elimination of the resources devoted to the A232 node.

NODE: AS-IS/A23T1	TITLE: MAINTAIN ASSET VISIBILITY AND ACCOUNTABILITY	NUMBER: DLA11

USED AT	AUTHOR : DLA	DATE:07/13/92	X	WORKING	READER	DATE	CONTEXT
	PROJECT : TOBEMINI	REV. :11/22/92		DRAFT			
	COMPANY: DEFENSE LOGISTICS AGENCY			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			



1 PURPOSE: To develop and document a composite view of future functional business processes.

2 VIEWPOINT: The functional decision-makers throughout the DLA Supply Centers.

NODE: TO-BE/A-0	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA1

USED AT	AUTHOR : DLA	DATE:07/13/92	X	WORKING	READER	DATE	CONTEXT
	PROJECT : TOBEMINI	REV. : 11/22/92		DRAFT			
	COMPANY: DEFENSE LOGISTICS AGENCY			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			

Managing consumable items in the DoD logistics universe is the function of supporting the Military Services and civilian agencies with many diverse items of a consumable nature. DLA manages 4.5 million consumable items. For this project, consumable items are defined as items of supply (except explosive ordnance, major end items of equipment and reparables) that are normally expended or depleted beyond recovery when used as designed or intended. (In this modeling effort, we have confined the functions of the management of consumable items to those performed within the walls of a Defense Supply Center (DSC).

The major products of a DSC are services and information. The DSCs manage a wide variety of items including mills, produce, fasteners, steel, lumber, packaged petroleum, electronic parts, medical equipment and supplies, tents, cots, and military uniforms. The principal functions that are performed to deliver the products include: Support the DSC Corporate Environment, Market the Business, Provide for Materiel Requirements, and Provide Engineering and Technical Services. In addition to its obvious fleet and unit customers, there is a significant effort expended to provide information to various stakeholders (e.g., Congress, DoD, DLA, Headquarters, and the Services), suppliers, Civilian Agencies, auditors, investigators, and other logistics agencies.

As indicated on the diagram, the purpose of the TO-BE model is to understand and document a composite view of future functional business processes. However the supportive narrative, the text diagram, is written as if this future vision were already in place. The viewpoint or perspective of the model is that of decision makers within the walls of DLA ICPs for all commodities except the bulk petroleum. The viewpoint does not include DLA Headquarters.

The DSCs work within guidelines (e.g. laws, regulations, plans policies, budget parameters, standards, and procedures) provided by numerous stakeholder (Congress, DoD, DLA Headquarters, Military Service Commands) under close observation of auditors, investigators, suppliers, and private citizens. The DSCs support a wide spectrum of military and civilian customers ranging through individual requisitioners, maintenance activities, weapon system program mangers to major logistic commands and agencies. In composite the DSCs have a diverse customer base having high expectations of dependable, cost-effective, quality support. To perform their mission, the DSCs maintain an active cooperative relationship with the industrial base, including manufacturers, suppliers, and trade associations. This close interface allows the DSCs to adopt and maintain sound operational approaches paralleling commercial practices where applicable. In addition, the DSCs depend heavily on established interfaces with logistics partners. For example, total logistics support requires a coordinated effort with such organizations as the DoD depots to process materiel directives for storage, inventory accountability, stock rotation, disassembly, an repair: the Defense Finance and Accounting Service, for customer billing and supplier payment; the Defense Reutilization and Market Service, for item reutilization and resale; Defense Contract Management activities for contract management and quality support; the

NODE: TO-BE/A-OT1	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA1

USED AT	AUTHOR : DLA	DATE:07/13/92	X	WORKING	READER	DATE	CONTEXT
	PROJECT : TOBEMINI	REV. :11/22/92		DRAFT			
	COMPANY: DEFENSE LOGISTICS AGENCY			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			

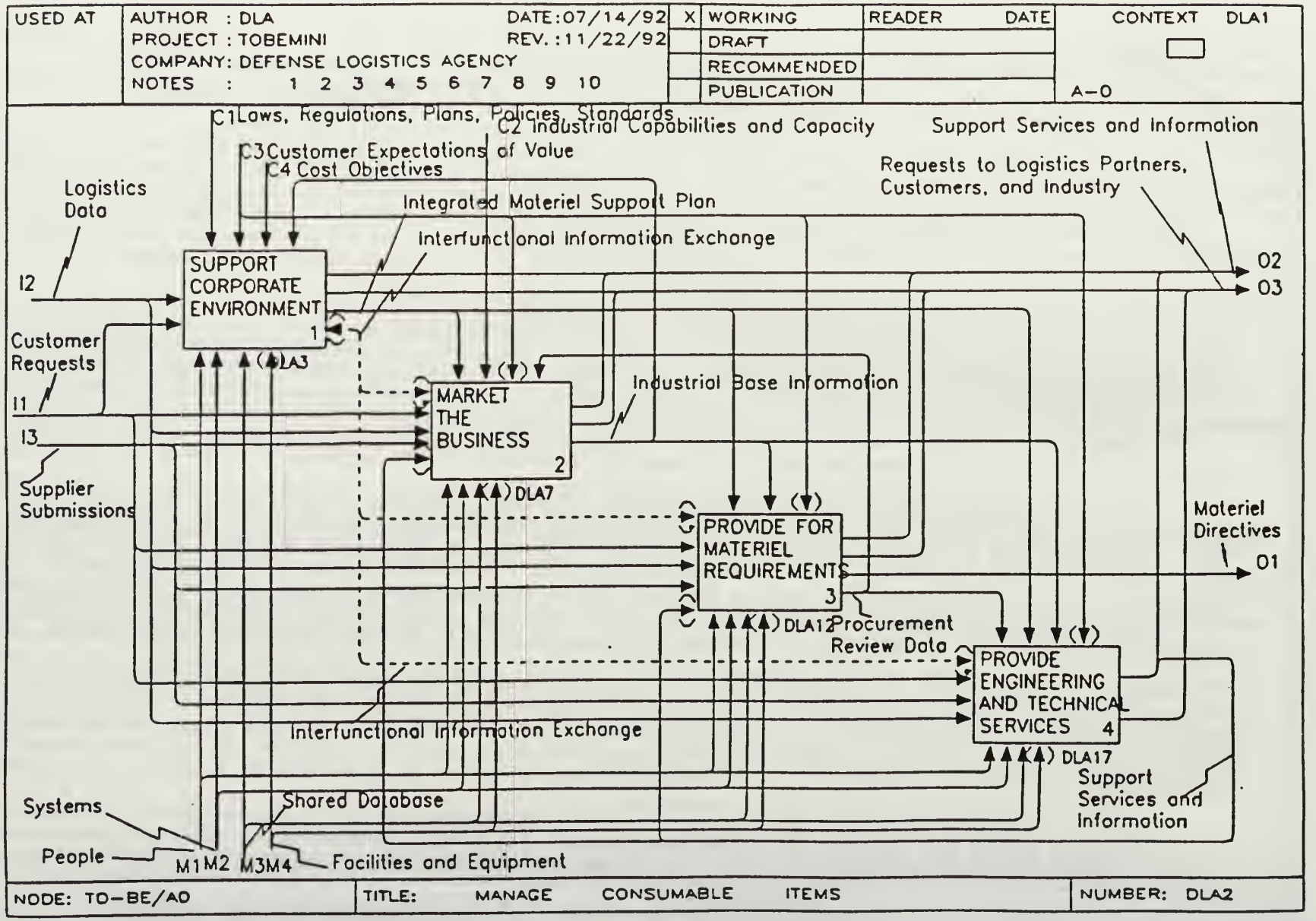
Defense Logistic Service Center, for logistics data; and the Military Traffic Management, for transportation information and support. The diagram reflects this central, coordinating role the ICPs play among customers, stakeholder, the commercial sector, and logistics partners.

However, the model is flexible and is not organizationally constrained. It will support any grouping of commodities or workforce configuration required to maintain DSC's materiel management mission effectively. The model's flexibility is further reflected in its ability to accommodate a diverse item population and requirement to maintain both a weapon system orientation and commodity orientation simultaneously. The model recognizes the need to minimize operational and costs by employing sound commercial practices while fully supporting the military readiness of its customers.

The model supports integrated, customer oriented planning and decision making reflecting common goals, objectives, strategies, and performance measurements. Extensive use of automated systems incorporating diverse computer tools, such as decision support systems and optimization models, implying artificial intelligence minimize manual intervention for processing and decision making purposes and associated operational costs. The automated system is self-evaluating and self-correcting with the identification of business costs and internal controls inherent in the system logic. The automated system is supported by a corporate database that allows information to be shared from a variety of sources in a manner that is transparent to the user. Similarly the database is populated through single data entry.

The integrated approach to decision making reflected in the model is further emphasized by the composition of the workforce. Multi-skilled, as well as specialists, people are required to deal with the challenges of a dynamic environment and complex management-by-exception situations requiring innovative solutions. The model is not intended to improve any particular mix of required skills, i.e. multi-skilled vs. specialized skills. The model recognizes the need for a highly skilled workforce by providing for training methods inculcating sound business practices and the ability to accommodate rapid change.

NODE: TO-BE/A-OT2	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA1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AUTHOR : DLA
PROJECT : TOBEMINI
COMPANY: DEFENSE LOGISTICS AGENCY
NOTES : 1 2 3 4 5 6 7 8 9 10
DATE:07/14/92
REV. :11/22/92
X WORKING
DRAFT
RECOMMENDED
PUBLICATION
READER DATE
CONTEXT DLA1
A-0
C1 Laws, Regulations, Plans, Policies, Standards
C2 Industrial Capabilities and Capacity
C3 Customer Expectations of Value
C4 Cost Objectives
Support Services and Information
Requests to Logistics Partners, Customers, and Industry
Logistics Data
Integrated Materiel Support Plan
Interfunctional Information Exchange
I2
SUPPORT CORPORATE ENVIRONMENT 1
O2
O3
Customer Requests
I1
I3
Supplier Submissions
A3
MARKET THE BUSINESS 2
Industrial Base Information
A7
PROVIDE FOR MATERIEL REQUIREMENTS 3
Materiel Directives
O1
A12
Procurement Review Data
PROVIDE ENGINEERING AND TECHNICAL SERVICES 4
A17
Support Services and Information
Interfunctional Information Exchange
Systems
Shared Database
People
M1 M2 M3 M4
Facilities and Equipment
NODE: TO-BE/A0
TITLE: MANAGE CONSUMABLE ITEMS
NUMBER: DLA2

USED AT	AUTHOR : DLA	DATE: 07/14/92	X	WORKING	READER	DATE	CONTEXT DLA1
	PROJECT : TOBEMINI	REV. : 11/22/92		DRAFT			
	COMPANY: DEFENSE LOGISTICS AGENCY			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			A-0

This diagram depicts the major processes of the Defense Supply Center (DSC) required to effectively manage consumable items. The four seporote processes should not be interpreted os an organizational breakout, but rather, as a logical flow of processes designed to meet customer needs. An organizational unit or even an individual could perform some aspect of all the major managing, planning, executing, evaluoting, and controlling functions depicted. The diagram olso reflects that the DSC operates within parameters established by various stakeholders in consonance with customers, suppliers and logistic portners.

While the diagram displays four separate processes, the component activities are highly interdependent. The hub of the Defense Supply Center (DSC) is a logically integrated, but not necessarily physically integrated shared database which serves os the central source of information deoling with oll aspects of logistic support. This shared database is not limited to DSC dota, but olso includes telecommunicotions access to data maintained by stakeholders, customers, suppliers, ond logistic partners. The interdependency among functions is extremely complex, as processes are normally iterative rather that sequential. While the responsibilities for particulor decisions are clearly defined, the decision making is highly integrated bosed upon an analysis of the totol logistic impact. This iterative, corporate approach to decision making combined with the large volume of business associated with 4.5 million items of supply, necessitates a high degree of automotion and o wide range of computer tools. Decision support mechanisms (ortificial intelligence and optimization models) allow the DSCs to consider olternatives with numerous variables ond vast quontities of corporate information in arriving at customer oriented, cost effective decisions. The dependency on automation shifts much of the work emphasis from execution and decision making to planning and evaluotion.

The first process, Support Corporate Envirnnment, focuses primarily on the monagement responsibility for planning and checking. Drawing on guidance (e.g. laws, regulations, policies, standards) received from various stakeholders, this function provides the framework for supporting the DSC mission. This process develops, provides visibility, and monitors the implementation of integrated corporate plans, gools, strategies, objectives, policies, procedures, and performance indicators and measurements. This function ensures that corporate planning results in effective and efficient monagement of resources, including materiel investment, personnel, automated information systems, facilities, and equipment. This node sees that all DSC functions ore operating in o synergistic fashion supporting common goals. Increased emphasis on strategic planning and more strenuous performance evaluation necessitates additional staffing for this function. Resources made available by mechanizing execution functions are utilized here. This transfer of expertise results in planning and performance evaluation that is pragmatic, rather than theoretical, in its approach.

NODE: TO-BE/AOT1	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA2

USED AT	AUTHOR : DLA	DATE:07/14/92	X	WORKING	READER	DATE	CONTEXT DLA1
	PROJECT : TOBEMINI	REV. : 11/22/92		DRAFT			
	COMPANY: DEFENSE LOGISTICS AGENCY			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			A-0

While the first process is essential in defining the DSC focus, the second process, Market the Business, is the heart of the Center. This function is truely unique since it creates a proactive and cooperative approach in customer and supplier relationships in fulfilling the logistics mission. This function guarantees a continous support relationship between the customer and the industrial base, with emphasis on buying response rather than inventory. This process works jointly with customers to project their needs for materiel and services. Similarly, it maintains a close relationship with the commercial sector to identify industry and commodity trends, business practices, and supplier support methods. This function is pivotal to matching customer needs with appropriate commercial practices and capabilities. As a result, optimized methods of support are identified that minimize operational and materiel investment costs while satisfying customer needs in a manner that meets expectations of timely, dependable, quality service at a reasonable price. Its flexibility allows the DSC to rapidly accommodate to changes in the customer or industry base. The function's central role is also evident in the active role it plays in controlling the introduction and removal of items in the DoD supply system. While automation is employed to the fullest extent practical, the need for additional emphasis on staffing for this service function has been recognized. Resources resulting from mechanizing the execution function were transferred here. In this way, customer and supplier expertise gained from practical experience is not lost but reutilized in this essential function. This reapplication of resources recognized that a new marketing approach was critical to ensure that the DSC remained the supplier of choice for the customer.

The customer-oriented, optimized method of support strategy identified in the second process is provided to the third major process, Provide for Materiel Requirements. This process juxtaposes this support strategy against the guidance (e.g., goals, objectives, resource allocation, performance measurements) to arrive at a micro level, item of supply support approach that meets customer requirements. To the fullest extent possible, up-front planning has allowed long term contracts to be in place to minimize customer wait time. Direct deliveries from supplier to customer are the norm, except where depot stockage is employed for reasons of military readiness or cost effectiveness. Streamlined systems and all associated data (e.g., customer requirements, catalogs, procurement history) essential for decision-making are in place to minimize operational and materiel investments costs. Constant performance measurement isolates and resolves potential problems that disrupt customer support. This node also includes the procurement process which operates in an integrated, streamlined, and automated fashion. The procurement process is characterized by the extensive use of Electronic Data Interchange (EDI), best value contracting and long-term contracts. This function plays an integral role in maintaining product quality. Of all the nodes, this execution function is the one most automated; relying heavily on a wide range of computer tools working in conjunction with the shared database. Up-front planning and integrated decision making have eliminated many of the resources previously

NODE: TO-BE/A0T2	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA2

USED AT	AUTHOR : DLA	DATE:07/14/92	X	WORKING	READER	DATE	CONTEXT DLA1
	PROJECT : TOBEMINI	REV. :11/22/92		DRAFT			
	COMPANY: DEFENSE LOGISTICS AGENCY			RECOMMENDED			
	NOTES : 1 2 3 4 5 6 7 8 9 10			PUBLICATION			A-0

expended on correcting problems. Labor intensive manual data entry and extensive review of computer decisions have been greatly reduced. Automated systems address peacetime and emergency situations allowing computer program logic adjustments to deal with changing scenarios, instead of relying on major personnel shifts.

The Provide Engineering ond Technical Services process includes those activities involved with delivery of engineering ond technical data services. It includes the management of the Department of Defense Standardization Program, Product Evaluation Programs and project related technicol services involving the determination and interpretation of characteristics in regard to specific use, environment and reliability. This function, which provides technicol services to the DSC as a utility, makes these same services available (as the second output/product) to logistic partners. The technical expertise developed in support of logistics management within the DSC is ovoilable to the service users and manufocturers/suppliers of both consumable and repairable items within the commodity area served by the ICP. Programs served by this node include Standardization Document Preparation, Item Reductian, Ports Control, Value Engineering, management of the testing program, and development af the Commodity Training Program. Functions not included are those ocquisition related and technical reviews (Item Reduction/Parts Control/Spec Review) where interpretation of requirements and nat criteria for review or individual item characteristics is at issue. Functions within this node are accomplished on a project basis and are available to the logistic partners an o fee for service basis.

In general, this break-out of functions recognizes the need for robust planning and performance evaluation. This approach emphasizes rapid delivery using accurate data and developing ond tracking customer-oriented support strategies that anticipate and address potential problems rather than correcting them after the fact, i.e., the traditional "putting out fires" syndrome. Processes associated with execution have been integroted, automoted and streamlined to such an extent that they no longer absorb a large proportian of available resources and management attention. This oppraach allaws the DSC an autward focus and analysis concerned with customers, stakeholders, suppliers, and logistic partners, rather than concentrating mainly on operational problems and Center-oriented solutions.

NODE: TO-BE/A0T3	TITLE: MANAGE CONSUMABLE ITEMS	NUMBER: DLA2

FUNCTIONAL FLOW vs. PROCESS FLOW

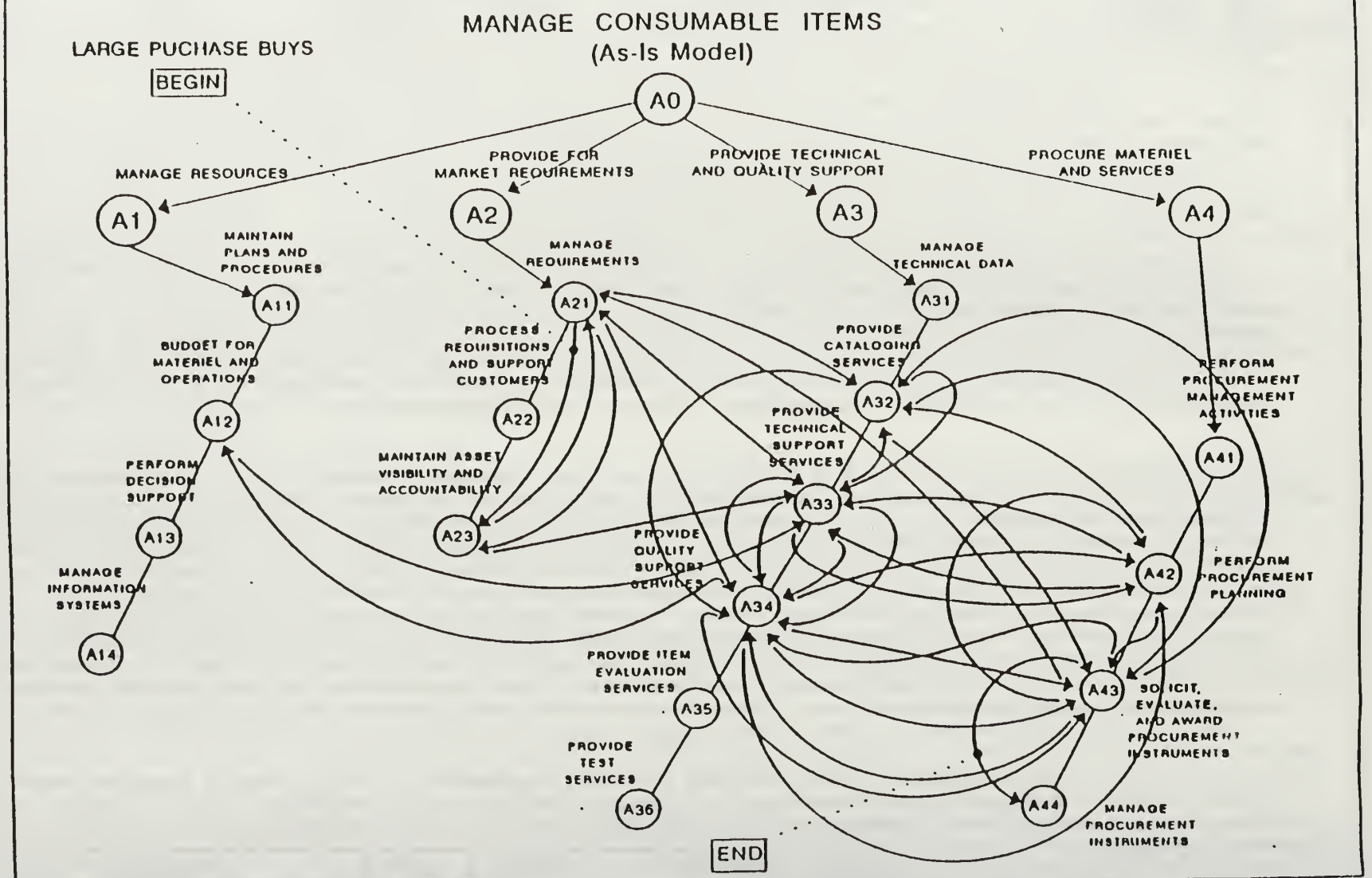


Figure 2-6. AS-IS Large Buy Functional vs. Process Flow

FUNCTIONAL FLOW vs. PROCESS FLOW

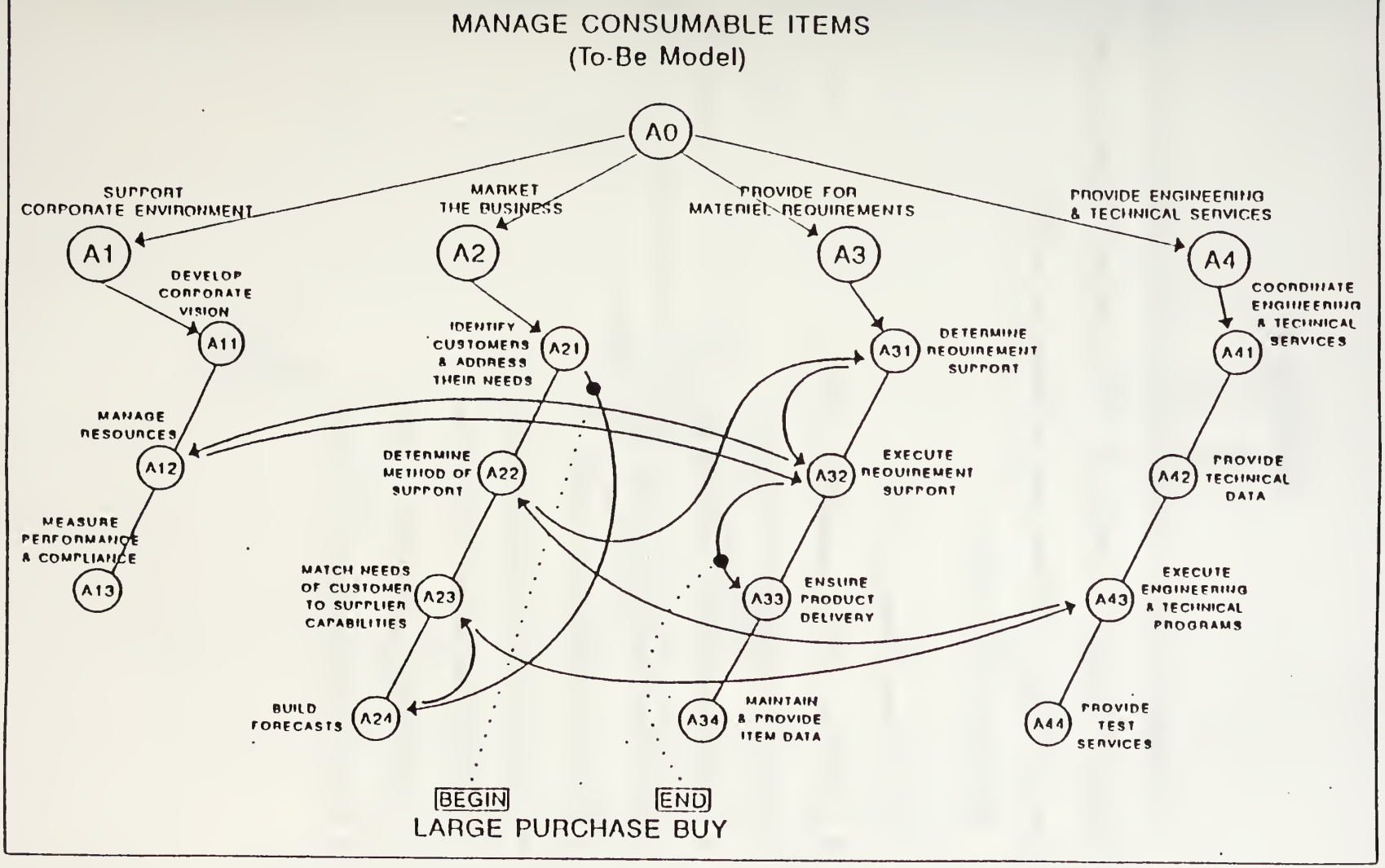


Figure 2-7. TO-BE Large Buy Functional vs. Process Flow

APPENDIX B

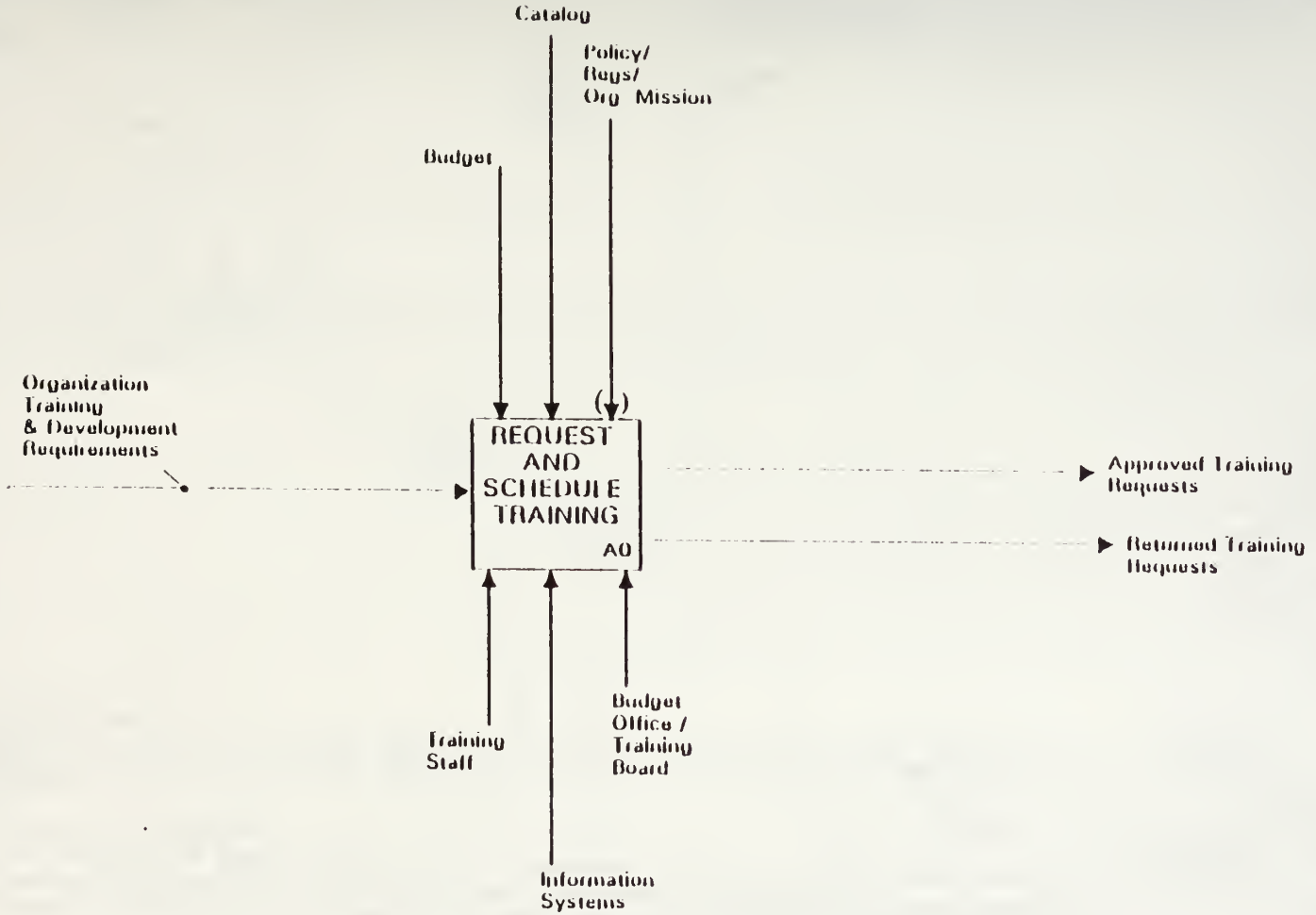
This appendix contains excerpts from the Human Resources Office Crystal City Pilot Project Final Report regarding the Civilian Personnel Training Business Process Improvement Project. The final report was developed in 1992.

The contents are as follows:

NOTES: 1 2 3 4 5 6 7 8 9 10

DRAFT
RECOMMENDED
PUBLICATION

Top



Purpose: To model the Current process of Requesting and Scheduling Training

Viewpoint: The training staff at the HRO CC Training Centers

NODE: AS IS/ A-0 | TITLE: REQUEST AND SCHEDULE TRAINING | NUMBER: AS IS

USED AT:	AUTHOR: HRO CC	DATE: 10/21/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS IS)	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

Navy Information Systems Management Center (NISMC) chartered a Working Group to develop a business model of employee development functions. The Working Group consisted of representatives from Concord Naval Weapons Station in California, Naval Warfare Center in Dahlgren, Virginia and Human Resources Office (HRO-CC) in Crystal City, Virginia.

The scope of the project was limited to "Request and Schedule Training" from the point of view of the HRO-CC Training Centers staff.

NUMBER: AS-IS

USED AT:	AUTHOR: HRO-CC	DATE: 10/14/92		WORKING	READER	DATE	CONTEXT:
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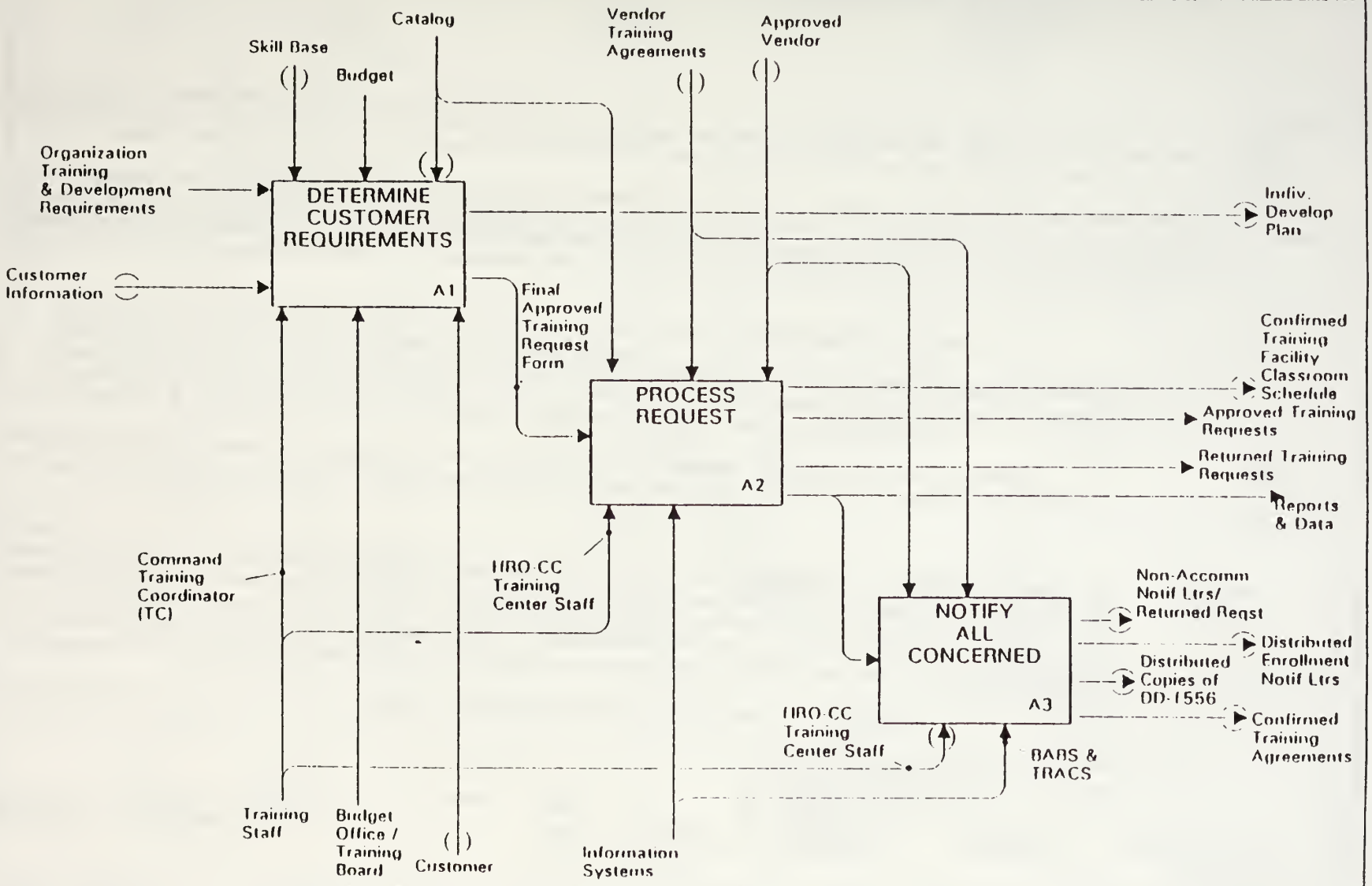
				PUBLICATION			



NODE: AS IS/ A0	TITLE: REQUEST AND SCHEDULE TRAINING	NUMBER: AS IS

USED AT:	AUTHOR: HRO-CC	DATE: 10/21/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS-IS)	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

The "REQUEST AND SCHEDULE TRAINING" function consists of three major sub-activities:

DETERMINE CUSTOMER REQUIREMENTS function involves the study of standards for a particular task/position and the competency of the employee responsible for completing the task. If the employee does not have the necessary skills, he/she must be trained in a formal setting to learn the needed skills. Other employees may request training that is not directly related to their job performance but may help the employee indirectly. The indicated reason for a customer requesting a course affects his/her priority in being scheduled for a particular course.

The PROCESS REQUEST function entails the actual processes involved in placing the customer in a class the customer wishes to attend. In HRO-CC Training Centers, the customer has three options of courses:

1) The course is provided by HRO-CC Training Centers and is usually held during duty-hours;
2) The course is offered by outside vendors such as other Department of Navy activities or DoD agencies, other Government agencies (including state or local), and Non-Government agencies including universities. Classes may be held during duty-hours or non-duty hours;
3) The Mandatory Acquisition Training course for employees in the acquistion/logistics series.

NOTIFY ALL CONCERNED function is the process used to confirm all concerned parties that an individual is or is not enrolled in a specific course. Notification letters and approved DD-1556 are either directly sent to employees or are sent to the employee via the Command's/Division's training coordinator. The instructors for in-house courses are notified by the confirmation of Vendor Training Agreements or in case of internal facilitators by the class roster.

Outside vendors are called to reserve a place for the customer and if needed, copies of DD-1556 are sent to vendor for confirmation. The signature on original copies of DD-1556 form assures a vendor that the Agency will pay for the tuition cost of the student whose name is on the DD-1556.

USED AT:	AUTHOR: HRO-CC	DATE: 10/15/92		READER	DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS-IS)	REV:	WORKING			
	NOTES: 1 2 3 4 5 6 7 8 9 10		DRAFT			
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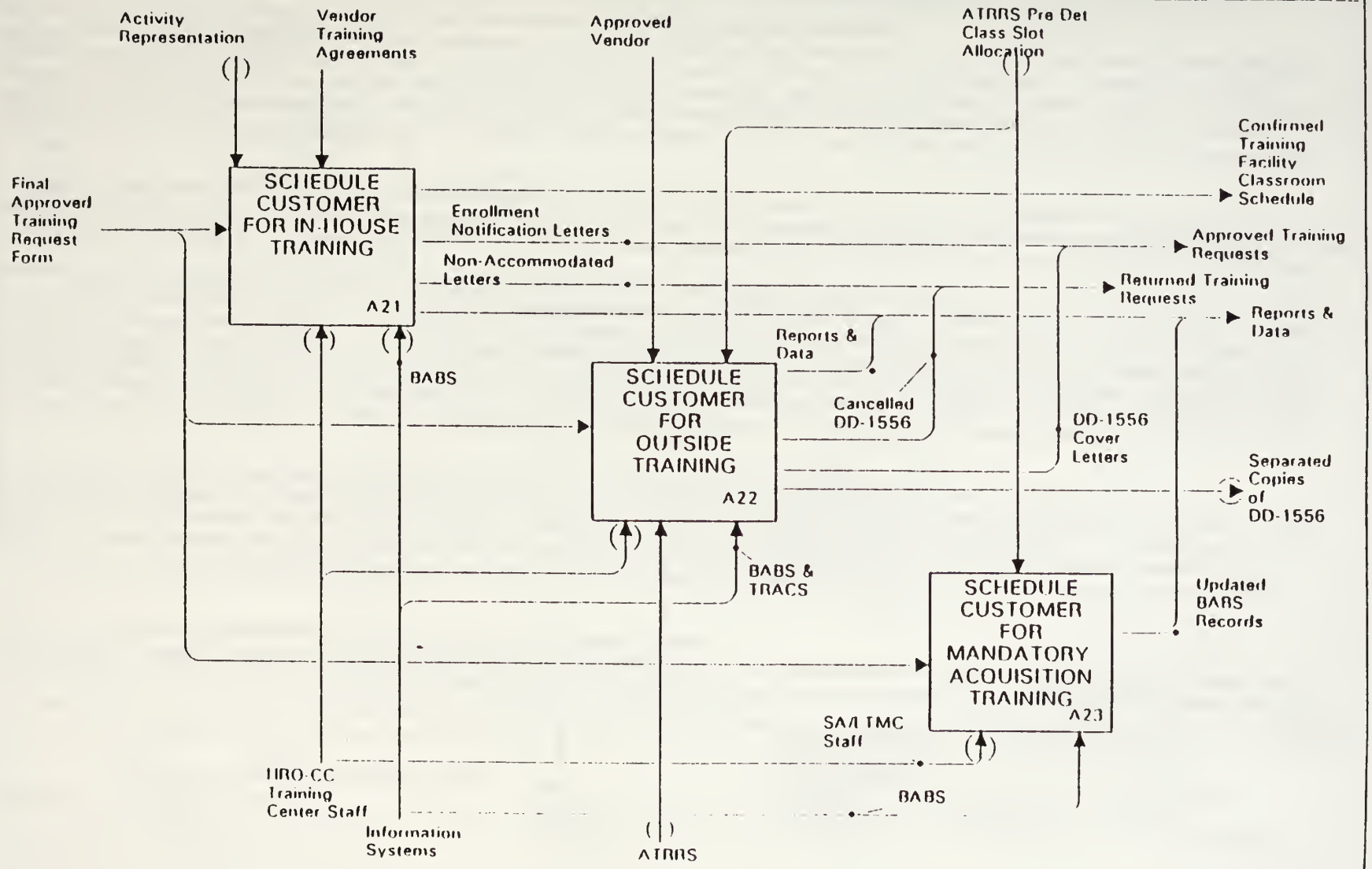
			PUBLICATION			



NODE: AS IS/ A2	TITLE: PROCESS REQUEST	NUMBER: AS IS

USED AT:	AUTHOR: HRO-CC	DATE: 10/21/92		WORKING	READER DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS-IS)	REV:		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

The PROCESS REQUEST function consists of the following sub-functions that occur at HRO-CC Training Centers. Please note that there are two Training Centers in HRO-CC. One is M/ATC (Management and Administrative Training Center) and the other one is SA/LMTC (Systems Acquisition/Logistics Management Training Center).

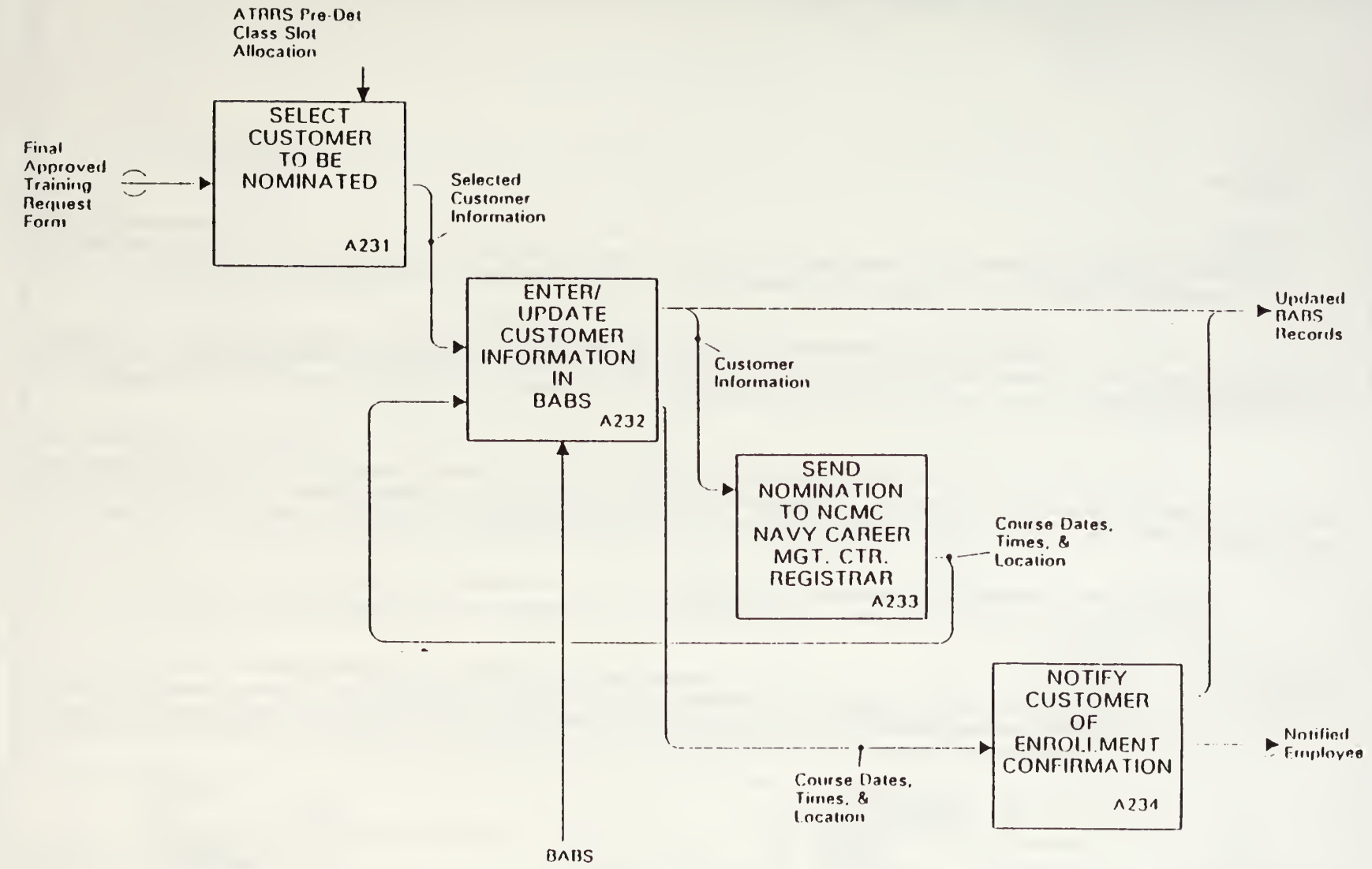
The SCHEDULE CUSTOMER FOR IN-HOUSE TRAINING involves the placement of customers in courses offered by the Training Centers. These classes are usually listed in the Training and Development Resource Guide (the course catalog developed by HRO-CC Training Centers) and are held at HRO-CC classrooms. The "Final Approved Training Request Form" received at HRO-CC verifies that customer is allowed to attend training. A course manager at HRO-CC is responsible for scheduling customers. The information on each session and its' attendees is stored in the BABS (Booking and Billing System) database system .

The SCHEDULE CUSTOMER FOR OUTSIDE TRAINING entails the placement of customers in courses offered by outside vendors (as listed on A0 text diagram). The information on the employee and requested course and vendor is stored in TRACS (Training and Cost System) database system. SA/LMTC stores employee and course information in BABS. In Addition, SA/LMTC may dial into the ATRRS system to register customers for non-mandatory DoD courses. ATRRS system, accepts representatives from all DoD offices (military and civilian). The number of class sessions listed in ATRRS is small compare to the number of requests, and the number of slots open to Navy employees is even more limited. Access to the ATRRS system is very involved because the system lacks sophistication in handling such large number of customers dialing into the system.

If an outside course does not have a tuition cost, only a training request form will be sent to the vendor. However, for courses that have a tuition cost a DD-1556 form must be printed. The HRO-CC Training Centers staff will prepare a DD-1556 form for cost courses. After approvals and line of accounting is on DD-1556, copies (9 total) of DD-1556 are separated and distributed.

SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRAINING is the process of sending the training request form to the SA/LMTC staff to enroll employees in acquisition/logistic series in mandatory acquisition related courses. These courses are available to all DoD employees (military and civilian) in the acquisition/logic series, therefore only a limited number of slots in each class is available to SA/LMTC customers. SA/LMTC will select a number of customers and send their information to another NCMC Navy Career Management Center Registrar to be processesed. NCMC will send actual course date and location back to SA/LMTC and SA/LMTC staff will notify customers about the course location and date.

USED AT:	AUTHOR: IIRO-CC	DATE: 10/23/92		WORKING	READER DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS-IS)	REV:		DRAFT		
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		



NODE: AS-IS/ A23	TITLE: SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRA	NUMBER: AS IS

USED AT:	AUTHOR: HRO-CC	DATE: 10/23/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS-IS)	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRAINING is the responsibility of the SA/LMTC. The staff at SA/LMTC will process training request forms to enroll employees in acquisition/logistic series in acquisition related courses. These courses are open to all DoD employees in acquisition/logistic series and the number of slots available to SA/LMTC customers is very limited.

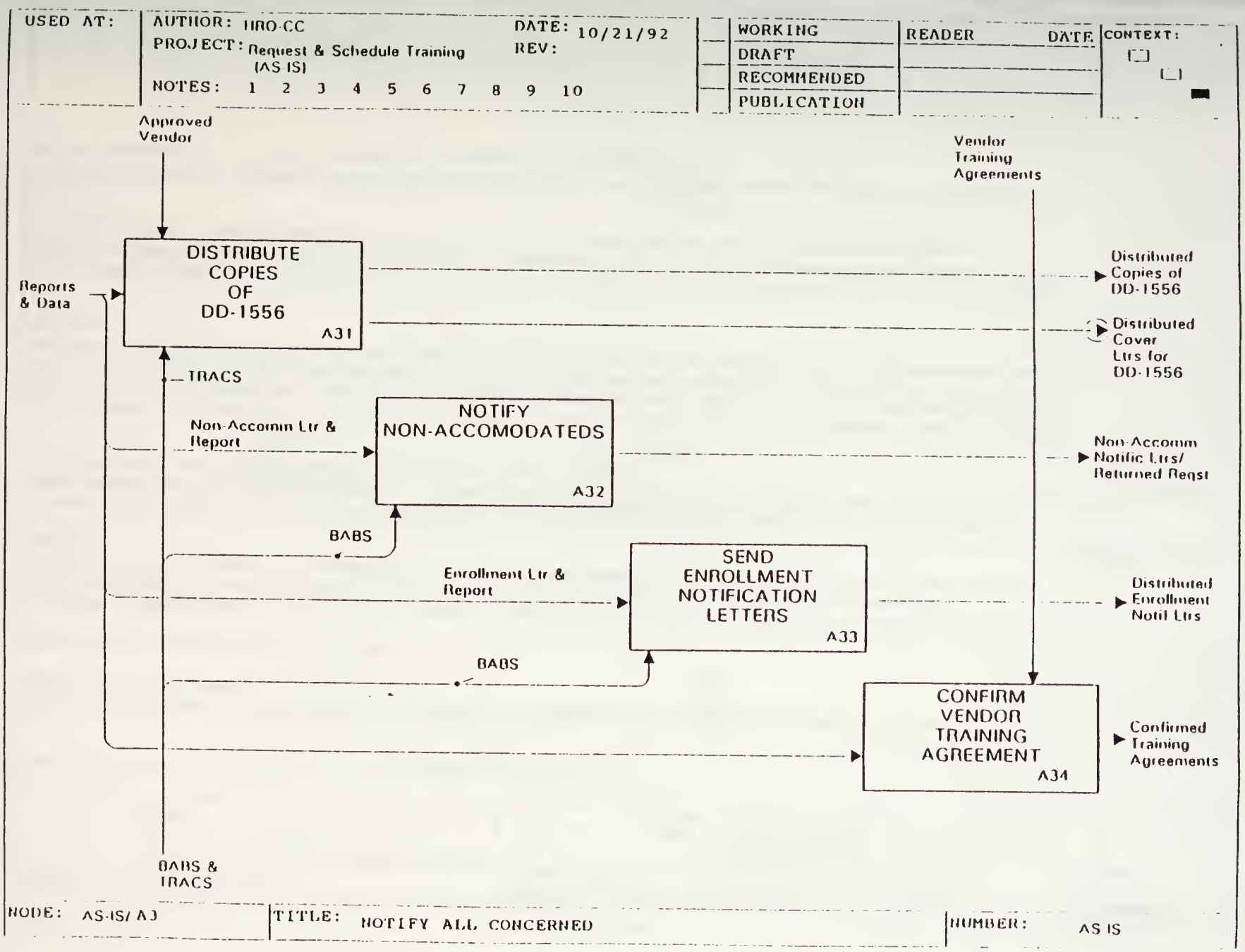
SELECT CUSTOMER TO BE NOMINATED is a function of the SA/LMTC staff. They will reviewall training request forms and choose a limited number of customers per course. The selection depends on the priority of the customer.

ENTER/UPDATE CUSTOMER INFORMATION IN BABS is a function of SA/LMTC staff who enter only the information of the selected customers in BABS (Booking and Billing System) database system. The original status of the customer is "M" which indicates the nomination is ready to be sent to NCMC Navy Career Management Center Registrar in Mechanicsburg, Pennsylvania.

SEND NOMINATION TO NCMC NAVY CAREER MGT. CTR. REGISTRAR is done by SA/LMTC staff. After the NCMC Navy Management Center Registrar processes the nominations (in ATRRS), they will return course date and course location to SA/LMTC. The customer status changes to "A"(approved) once NCMC processes the nominations.

NOTIFY CUSTOMER OF ENROLLMENT CONFIRMATION is currently done by SA/LMTC staff. Information regarding course name, date(s), time(s), and actual location is given to customer via telephone or fax machine (usually because of time contraints).

NODE: AS-IS/ A23TEXT	TITLE: SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRAINING	NUMBER: AS IS


USED AT:
AUTHOR: HRO-CC
DATE: 10/21/92
PROJECT: Request & Schedule Training (AS IS)
REV:
NOTES: 1 2 3 4 5 6 7 8 9 10
WORKING
DRAFT
RECOMMENDED
PUBLICATION
READER
DATE
CONTEXT:
Approved Vendor
Vendor Training Agreements
DISTRIBUTE COPIES OF DD-1556
A31
Reports & Data
Distributed Copies of DD-1556
Distributed Cover Ltrs for DD-1556
TRACS
NOTIFY NON-ACCOMODATEDS
A32
Non-Accomm Ltr & Report
Non-Accomm Notific Ltrs/ Returned Reqst
BABS
SEND ENROLLMENT NOTIFICATION LETTERS
A33
Enrollment Ltr & Report
Distributed Enrollment Notif Ltrs
BABS
CONFIRM VENDOR TRAINING AGREEMENT
A34
Confirmed Training Agreements
BABS & TRACS
NODE: AS-IS/ A3
TITLE: NOTIFY ALL CONCERNED
NUMBER: AS IS

USED AT:	AUTHOR: HRO-CC	DATE: 10/21/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: Request & Schedule Training (AS-IS)	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

The NOTIFY ALL CONCERNED function consists of the following:

SEND COPY OF DD-1556 TO CORRECT DESTINATION is the process of sending copies of DD-1556 to appropriate destinations:

Budget Office keeps copy 6 of DD-1556.

If there is sufficient time to use U.S. mail, copies 3,4 and 5 of DD-1556 along with a cover letter are sent to the vendor directly. Copies 8,9 and a cover letter are sent to the employee's training coordinator at Command site to forward to the employee. For HRO-CC employees, copies 8 and 9 are given to the employee directly.

If there is not sufficient time to mail copies of DD-1556, then copies 3,4,5,8,9 and cover letter are given to the employee via the training coordinator. In some cases vendor copis of DD-1556 are faxed to the vendor. Later the employee will take original copies to the vendor directly.

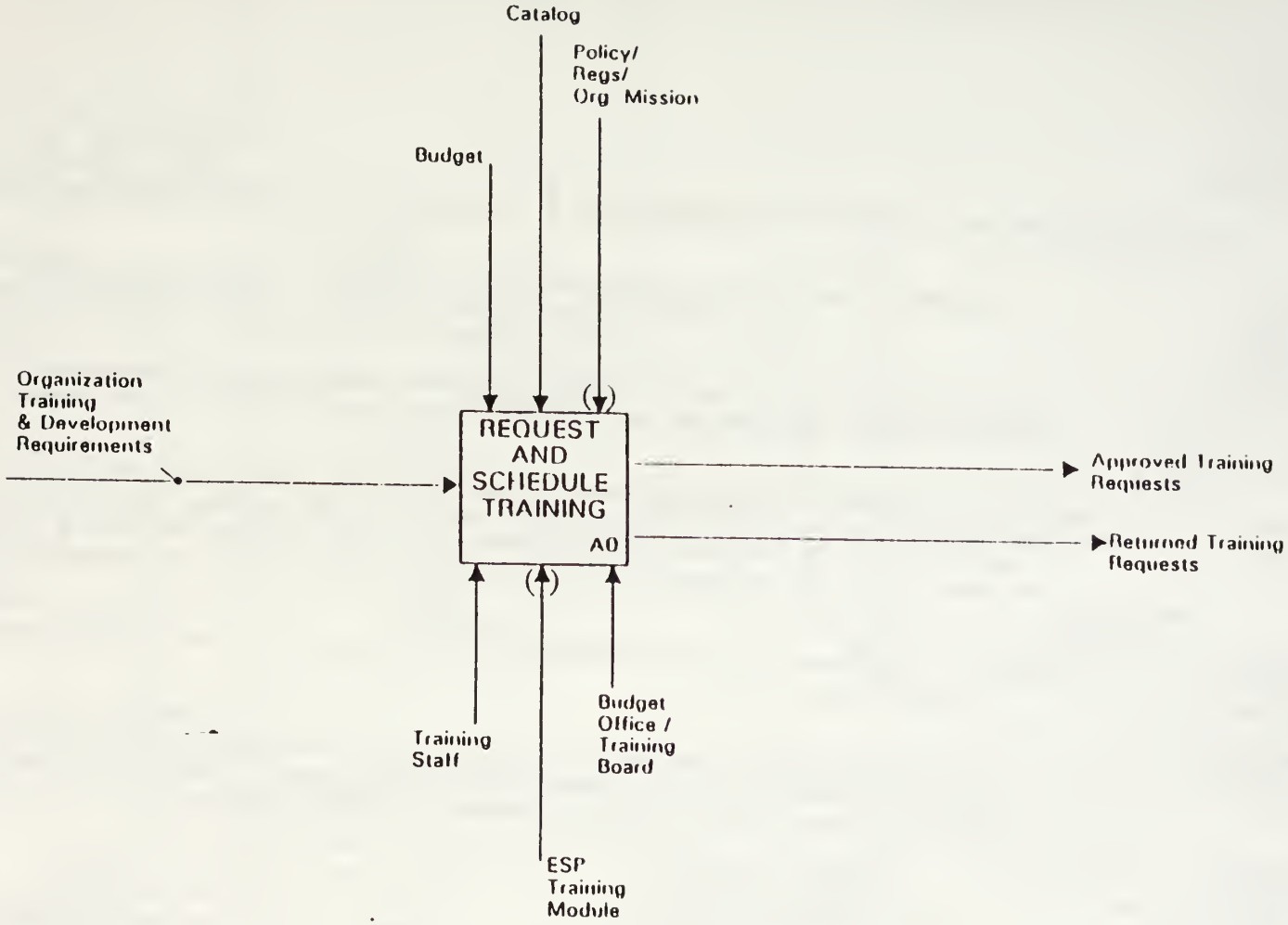
NOTIFY NON-ACCOMMODATES function is notifying a customer either directly or via his/her training coordinator about a requested training that was not accommodated for a variety of reasons. Non-accommodated letters will be checked against a report to assure accuracy. Then, letters are sent to employees requesting HRO-CC; in-house courses. Cancelled DD-1556 or returned requests are used to notify employees about non-accommodated outside courses.

SEND ENROLLMENT NOTIFICATION LETTER function is sending an enrollment letter to the customer directly or via his/her training coordinator to confirm that the customer is scheduled for a particular HRO-CC in-house course. Letters are checked against enrollment reports to assure accuracy before they are sent to customers.

CONFIRM VENDOR TRAINING AGREEMENTS is the function of confirming training agreements based on the acutal number of customers scheduled for the course, the course site, etc.

NODE: AS-IS/ A3TEXT	TITLE: NOTIFY ALL CONCERNED	NUMBER: AS-IS

USED AT:	AUTHOR: HRO-CC	DATE: 10/28/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: TO BE Request & Schedule Training	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			



Purpose: To model the To-Be process of Requesting and Scheduling Training

Viewpoint: The training staff at the HRO-CC Training Centers

NODE: TO-BE /A-0	TITLE: REQUEST AND SCHEDULE TRAINING (TO-BE)	NUMBER: TO-BE

USED AT:	AUTHOR: HRO-CC	DATE: 10/28/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: TO-BE Request & Schedule Training	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

Navy Information Systems Management Center (NISMC) chartered a Working Group to develop a business model of employee development functions. The Working Group consisted of representatives from Concord Naval Weapons Station in California, Naval Warfare Center in Dahlgren, Virginia and Human Resources Office (HRO-CC) in Crystal City, Virginia.

The scope of the project is limited to the "TO-BE" "Request and Schedule Training" from the point of view of the HRO-CC Training Centers staff.

The To-be "Request and Schedule Training" is part of Employee Development module that will be added to the already existing Electronic System for Personnel (ESP). The automated system is on a ethernet Local Area Network(LAN) using Netware 386. The users are either directly connected to the LAN or may dial-into the system via a modem. The database management software that will be used to keep information on employee development records is Foxpro version 2.5.

Many of the currently manual processes will be performed electronicallyand redundancies will be eliminated:

1) The information on employees (from NCPDS and payroll databases) and courses will be loaded into the system electronically;
2) Training request forms are sent to concerned parties electronically;
3) Approvals for training will be done by the use of passwords (electronic signatures);
4) The system will generate DD-1556 forms, notification letters, standard reports and ad-hoc reports.

The control "Policy/Regs/Org Mission" and the mechanism "ESP Training Module" are tunneled at this level because they affect all subsequent children.

USED AT:

AUTHOR: HRO-CC

PROJECT: TO BE Request & Schedule Training

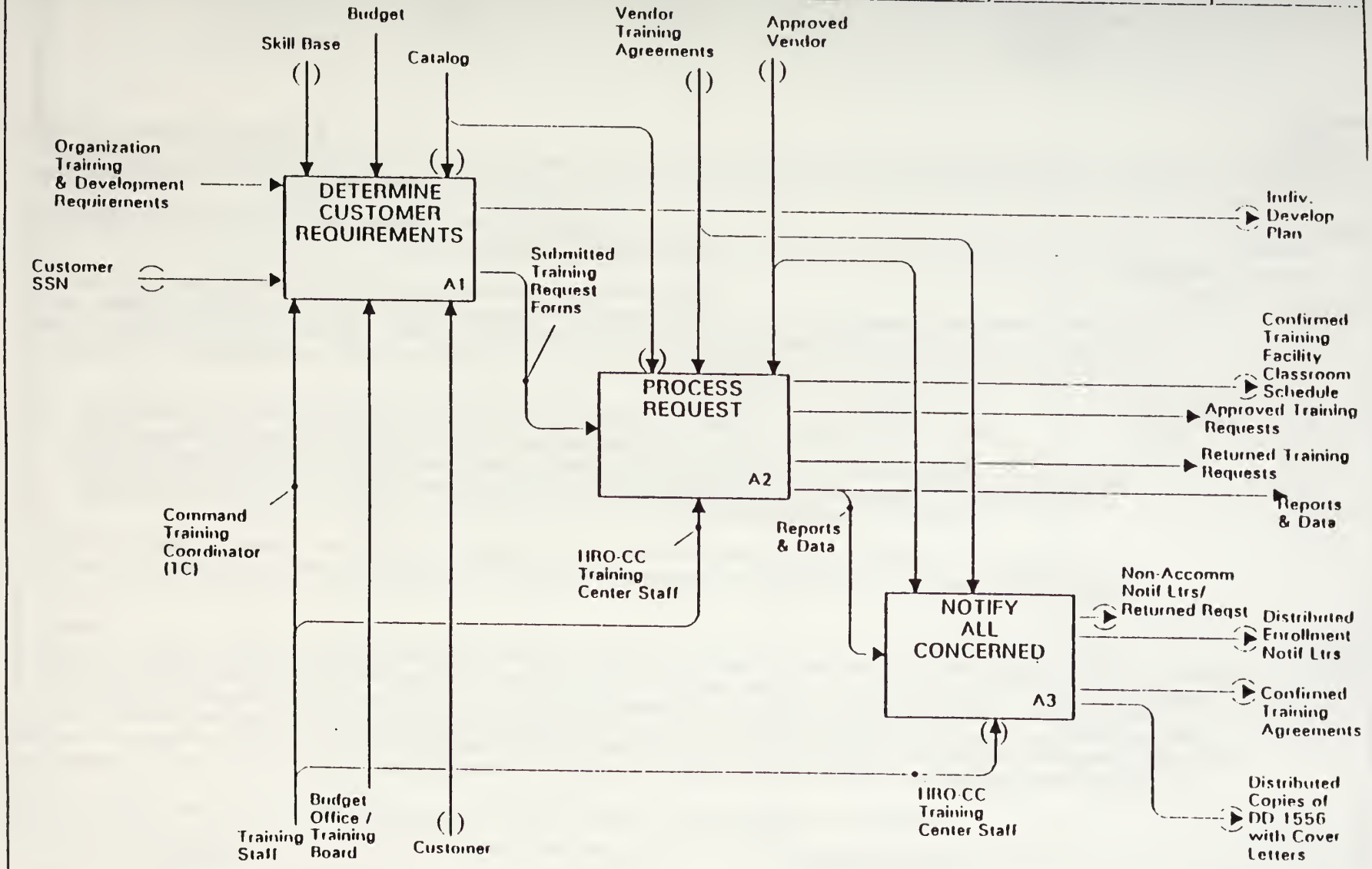
DATE: 10/28/92

REV:

NOTES: 1 2 3 4 5 6 7 8 9 10

	READER	DATE
WORKING		
DRAFT		
RECOMMENDED		
PUBLICATION		

CONTEXT:



NODE: TO BE /A0

TITLE: REQUEST AND SCHEDULE TRAINING (TO-BE)

NUMBER: TO BE

USED AT:	AUTHOR: HRO CC	DATE: 10/28/92		WORKING	READER DATE	CONTEXT:
	PROJECT: TO BE Request & Schedule Training	REV:		DRAFT		Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED		
				PUBLICATION		

The "REQUEST AND SCHEDULE TRAINING" function consists of three major sub-activities:

DETERMINE CUSTOMER REQUIREMENTS function involves processes that are performed as the Command site. It begins with determining an employees' needed skills; the employee requesting training and getting supervisor approvals for that training; and the training coordinator entering the information into ESP (Electronic System for Personnel) and electronically submitting the request to HRO-CC Training Centers. For Navy employees who are serviced by the HRO-CC Training Centers, the employee information in ESP is updated weekly from NCPDS (Navy Civilian Personnel Database System); and the information regarding the employee's training history will be stored in ESP 's training history database.

The PROCESS REQUEST function entails the actual processes involved in placing the customer in a class the customer wishes to attend. In HRO-CC Training Centers, the customer has three options of courses:

1) The course is provided by HRO-CC Training Centers and is usually held during duty-hours;
2) The course is offered by outside vendors such as other Department of Navy activities or DoD agencies, other Government agencies (including state or local), and Non-Government agencies including universities. Classes may be held during duty-hours or non-duty hours;
3) The Mandatory Acquisition Training course for employees in the acquistion/logistics series.

NOTIFY ALL CONCERNED function is the process used to confirm all concerned parties that an individual is or is not enrolled in a specific course. Notification letters and approved DD-1556 are directly sent to employees at their mailing addresses (as stored in payroll database). Training Coordinators can check the "status code" on the request(s) in the ESP to see if the letter was sent to the employee.

The instructors for in-house courses are notified by the confirmation of Vendor Training Agreements or in case of internal facilitators by the class roster/attendance sheet.

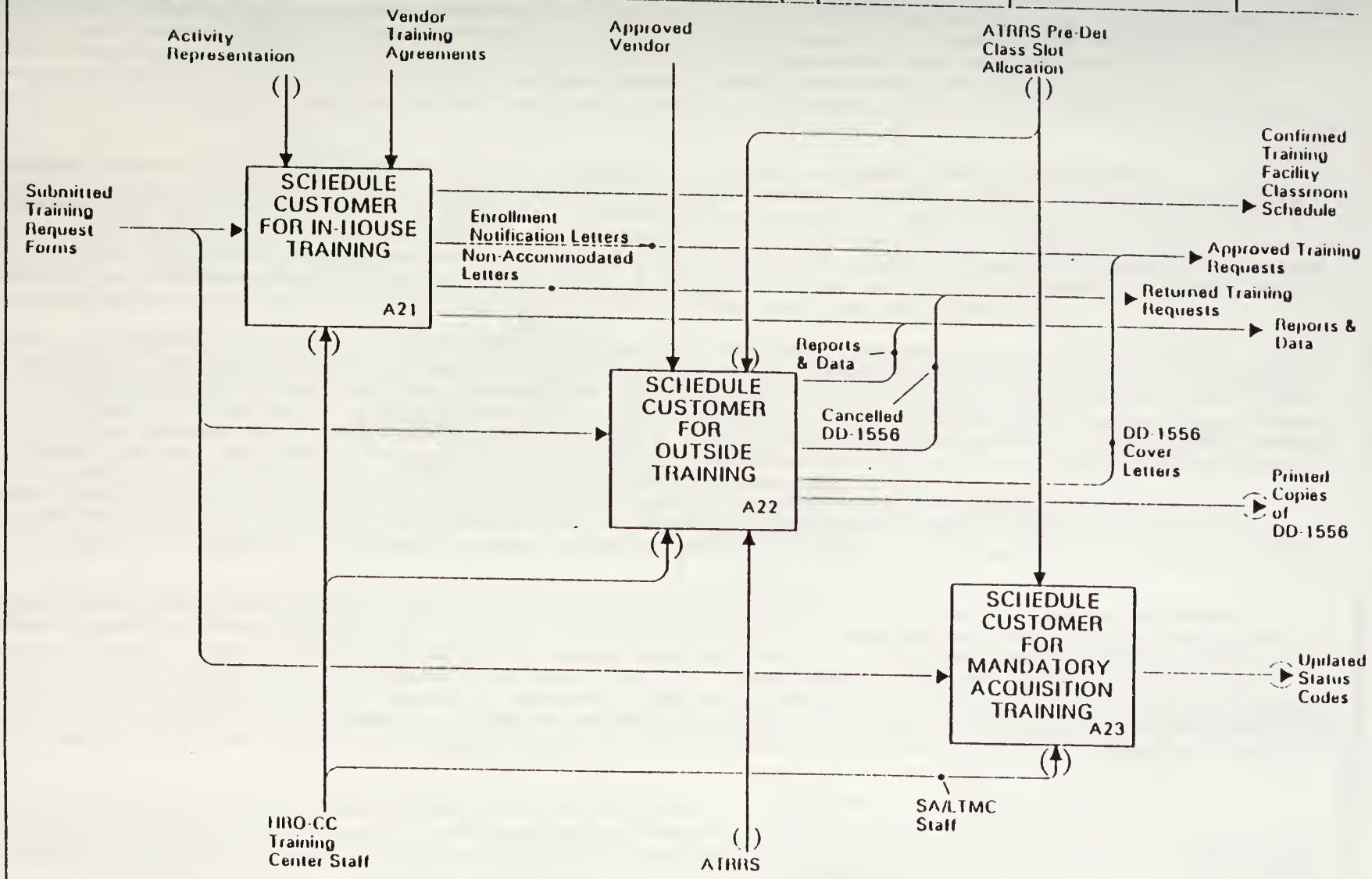
Outside vendors are called to reserve a place for the customer; and if needed, copies of DD-1556 are sent to vendor for confirmation. A printed copy of DD-1556 form indicates that the Agency will pay for the tuition cost of the student whose name is on the DD-1556.

NODE: TO-BE/A01EXT	TITLE: REQUEST AND SCHEDULE TRAINING (TO-BE)	NUMBER: TO-BE

PROJECT: TO-BE Request & Schedule Training REV:

NOTES: 1 2 3 4 5 6 7 8 9 10

	WORKING	READER	DATE
	DRAFT		
	RECOMMENDED		
	PUBLICATION		



NODE: TO-BE /A2	TITLE: PROCESS REQUEST (TO BE)	NUMBER: TO-BE

USED AT:	AUTHOR: HRO CC	DATE: 10/28/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: TO BE Request & Schedule Training	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

The PROCESS REQUEST function consists of the following sub-functions that occur at HRO-CC Training Centers. Please note that there are two Training Centers in HRO-CC. One is M/ATC (Management and Administrative Training Center) and the other one is SA/LMTC (Systems Acquisition/Logistics Management Training Center).

The SCHEDULE CUSTOMER FOR IN-HOUSE TRAINING involves the placement of customers in courses offered by the Training Centers. These classes are usually listed in the Training and Development Resource Guide (the course catalog developed by HRO-CC Training Centers) and are held at HRO-CC classrooms. The training request forms are seen in course-session folders at HRO-CC Training Centers; and a course/program manager at HRO-CC is responsible for scheduling customers in that course. The list of training request forms can be arranged by Command code and priority. This facilitates the job of the course manager in assuring there is fair Command/Activity representation in each course session. [A redundant data entry to BABS (Booking and Billing System) is eliminated, since all employee/course information is entered by training coordinators and is in the system].

The SCHEDULE CUSTOMER FOR OUTSIDE TRAINING entails the placement of customers in courses offered by outside vendors (as listed on To-Be/A0 text diagram). The information on the employee and approved courses and vendors is already in the ESP system (approvals are obtained prior to requesting an outside course). [A redundant step in entering employee and course information into TRACS (Training and Cost System) database system is eliminated].
In Addition, SA/LMTC may dial into the ATRRS system to register customers for non-mandatory DoD courses. ATRRS system, accepts representatives from all DoD offices (military and civilian). The number of class sessions listed in ATRRS is small compare to the number of requests, and the number of slots open to Navy employees is even more limited. Access to the ATRRS system is very involved because the system lacks sophistication in handling such large number of customers dialing into the system. After an employee is approved for a course in ATRRS, then SA/LMTC staff must enter employee and course information into ESP. However, this step will be very easy because only employee social security number and course/vendor name is needed.

If an outside course does not have a tuition cost, only a training request form will be sent to the vendor.
However, for cost courses a DD-1556 form must be printed. If there is a need for budget signature, employee TRFs are sent to the Budget Office electronically, approvals are also electronic; and forms are returned to appropriate training staf. The HRO-CC Training Centers staff will prepare DD-1556 forms only for HRO-CC employees. For other employees, DD-1556 forms will be printed at the Command site. The system will be able to generate the form and the information on employees on that form. [The acutal DD-1556s forms are expensive; and by printing the form on white paper, there will be cost savings. Also, the trining staff will only print as many copies of DD-1556s as necessary.] After DD-1556 forms are printed, they will be distributed.

SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRAINING is the process of electronically sending the training request form to the SA/LMTC staff to enroll employees in acquisition/logistic series in mandatory acquisition related courses. These courses are available to all DoD employees (military and civilian) in the acquisition/logic series, therefore only a limited number of slots in each class is available to SA/LMTC customers. SA/LMTC will select a number of customers and send their information to NCMC Navy Career Management Center Registrar to be processesed. NCMC will send actual course date and location back to SA/LMTC and SA/LMTC staff will notify customers about the course location and date.

NODE: TO BE/A2TEXT	TITLE: PROCESS REQUEST (TO-BE)	NUMBER: TO-BE

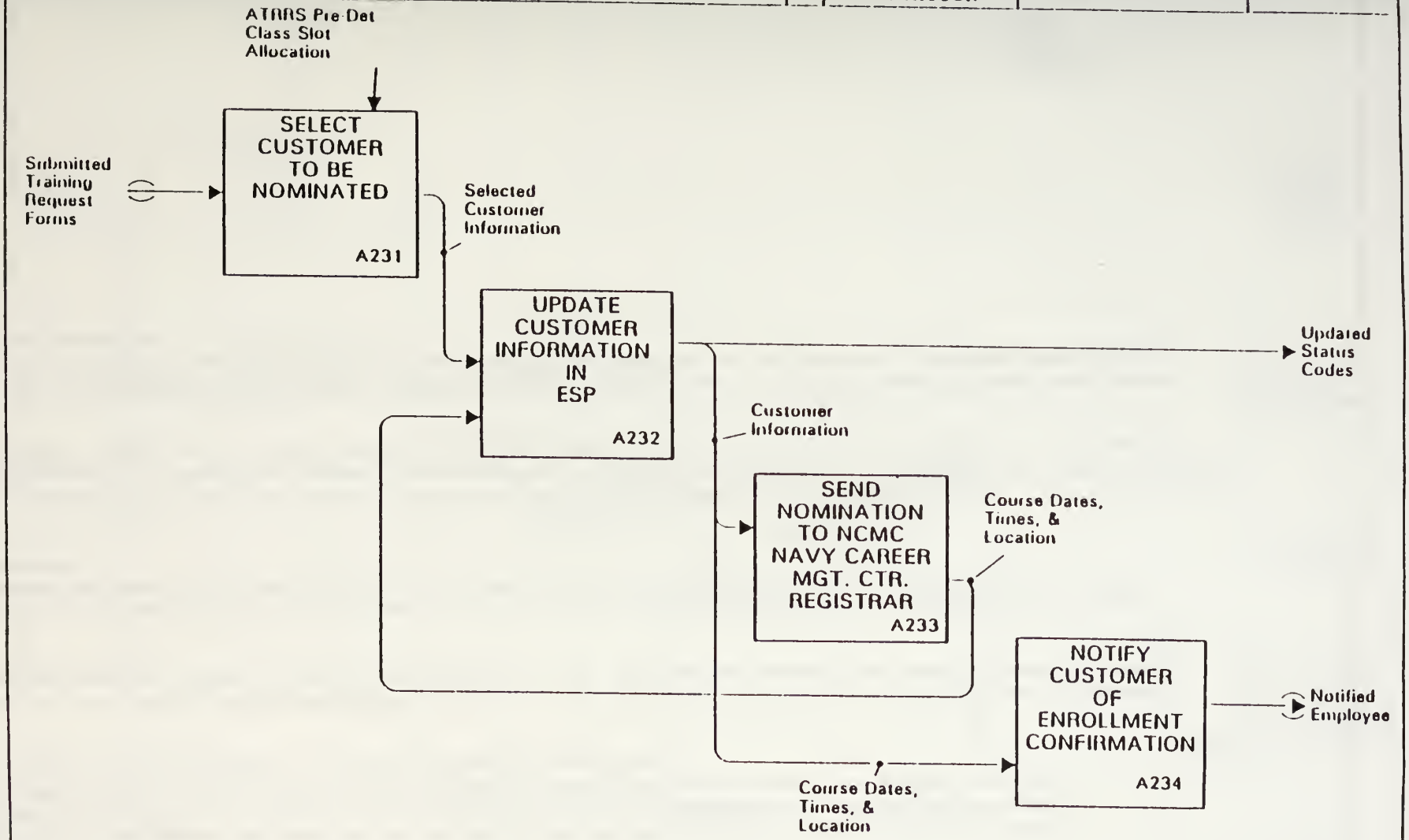
USED AT:

AUTHOR: HRO-CC
PROJECT: TO-BE Request & Schedule Training
NOTES: 1 2 3 4 5 6 7 8 9 10

DATE: 10/28/92
REV:

	READER	DATE
WORKING		
DRAFT		
RECOMMENDED		
PUBLICATION		

CONTEXT:



NODE: TO-BE /A23	TITLE: SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRA	NUMBER: TO BE

USED AT:	AUTHOR: IRO CC	DATE: 10/28/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: TO BE Request & Schedule Training	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRAINING is the responsibility of the SA/LMTC. The staff at SA/LMTC will process training request forms to enroll employees in acquisition/logistic series in acquisition related courses. These courses are open to all DoD employees in acquisition/logistic series and the number of slots available to SA/LMTC customers is very limited.

SELECT CUSTOMER TO BE NOMINATED is a function of the SA/LMTC staff. They will review all training request forms and choose a limited number of customers per course. The selection depends on the priority of the customer.

UPDATE CUSTOMER STATUS is a function of SA/LMTC staff. The original status of the customer is "M" which indicates the nomination is ready to be sent to NCMC Navy Career Management Center Registrar in Mechanicsburg, Pennsylvania.

SEND NOMINATION TO NCMC NAVY CAREER MGT. CTR. REGISTRAR is done by SA/LMTC staff. After the NCMC Navy Management Center Registrar processes the nominations (in ATRRS), they will return course date and course location to SA/LMTC. This information will be added to customer record in ESP; and customer status changes to "A"(approved).

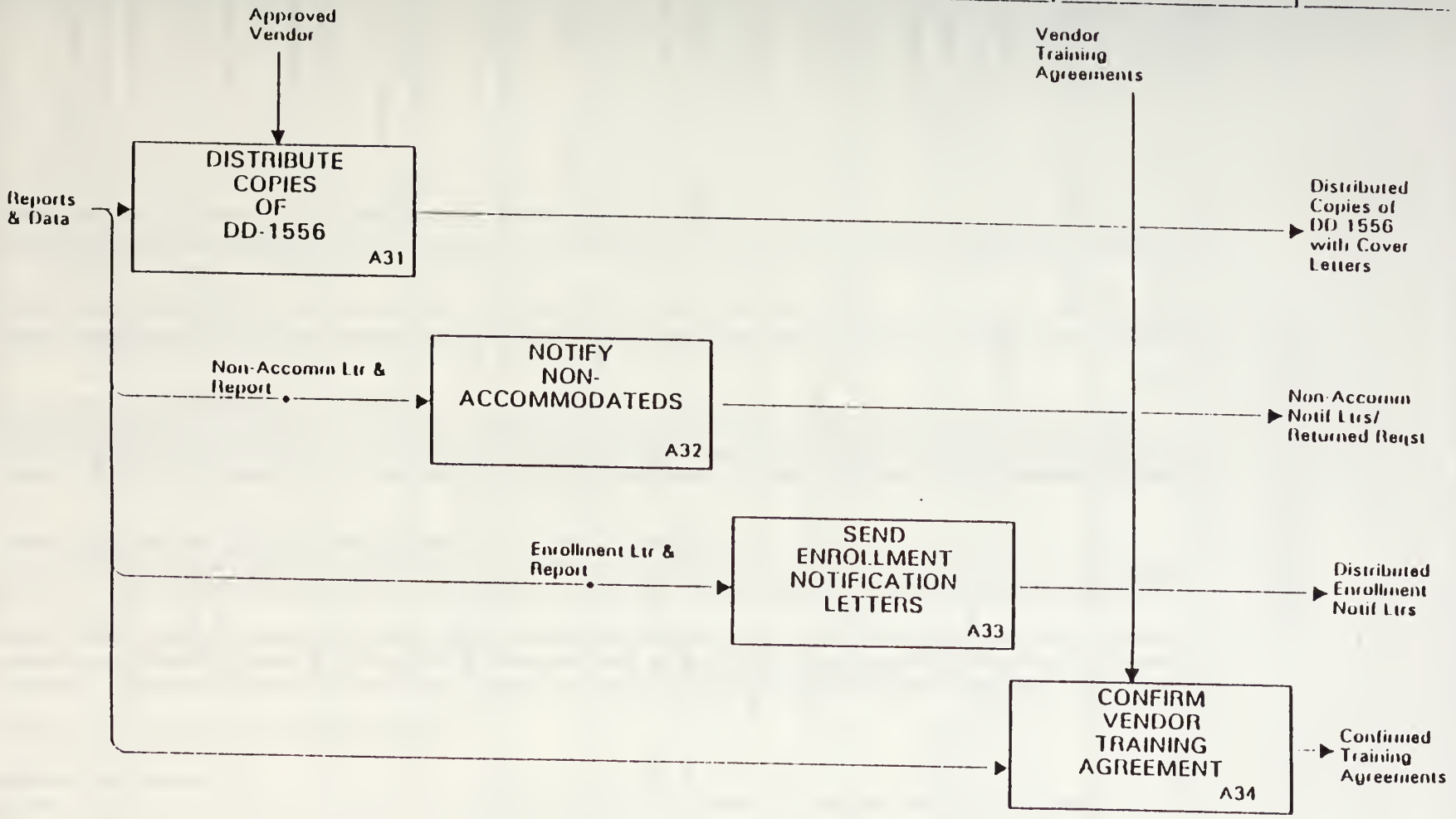
NOTIFY CUSTOMER OF ENROLLMENT CONFIRMATION is currently done by SA/LMTC staff. Information regarding course name, date(s), time(s), and actual location is given to customer via telephone or fax machine (usually because of time contraints).

NODE: TO BE/A231EXT	TITLE: SCHEDULE CUSTOMER FOR MANDATORY ACQUISITION TRAINING BEI	NUMBER: TO BE

PROJECT: TO BE Request & Schedule Training REV:

NOTES: 1 2 3 4 5 6 7 8 9 10

	WORKING	READER	DATE
	DRAFT		
	RECOMMENDED		
	PUBLICATION		



NODE: TO BE / A3 | TITLE: NOTIFY ALL CONCERNED (TO BE) | NUMBER: TO BE

USED AT:	AUTHOR: HRO CC	DATE: 10/28/92		WORKING	READER	DATE	CONTEXT:
	PROJECT: TO BE Request & Schedule Training	REV:		DRAFT			Top
	NOTES: 1 2 3 4 5 6 7 8 9 10			RECOMMENDED			
				PUBLICATION			

The NOTIFY ALL CONCERNED function consists of the following:

SEND COPY OF DD-1556 TO CORRECT DESTINATION is the process of sending copies of DD-1556 to appropriate destinations:

Budget Office keeps copy 6 of DD-1556.

If there is sufficient time to use U.S. mail, copies 3,4 and 5 of DD-1556 along with a cover letter are sent to the vendor directly. Copies 8,9 and a cover letter are sent to the employee's training coordinator at Command site to forward to the employee. For HRO-CC employees, copies 8 and 9 are given to the employee directly.

If there is not sufficient time to mail copies of DD-1556, then copies 3,4,5,8,9 and cover letter are given to the employee via the training coordinator. In some cases vendor copis of DD-1556 are faxed to the vendor. Later the employee will take original copies to the vendor directly.

NOTIFY NON-ACCOMMODATES function is notifying a customer directly that was not accommodated by use of non-accommodated letters. The training coordinators are electronically notified by the "status code" of the employee record. Cancelled DD-1556 or returned requests are used to notify HRO-CC employees about non-accommodated outside courses.

SEND ENROLLMENT NOTIFICATION LETTER function is sending an enrollment letter to the customer directly. The training coordinator is notified by the "status code" of the employee record.

CONFIRM VENDOR TRAINING AGREEMENTS is the function of confirming training agreements based on the acutal number of customers scheduled for the course, the course site, etc.

NODE: TO BE/A3TEXT	TITLE: NOTIFY ALL CONCERNED (TO-BE)	NUMBER: TO-BE

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